IARTEM 1991-2016: 25 YEARS DEVELOPING TEXTBOOK AND EDUCATIONAL MEDIA RESEARCH

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(Editors)

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INTRODUCTION

IARTEM (International Association for Research on Textbooks and Educational Media) celebrates its 25th birthday. An association that is still young, in good health, in adulthood, still in the prime of its life and whose objectives are more relevant than ever. Indeed, even if textbooks remain criticized, in the age of the Internet, they still play a key role in education. And IARTEM is not only interested in textbooks, but in all educational resources and media: their importance is growing. Recent conferences have attracted a large audience while the landscape is gradually changing: textbook approval systems are becoming increasingly rare, the Internet is promoting the circulation of a large number of educational resources, OER (open educational resources) are developing, etc.

In the knowledge society, education cannot be achieved without the use of textbooks, educational media and more generally educational resources. The way in which these resources are designed, selected, modified, used, exchanged, but also indexed, studied, qualified, the stereotypes and ideologies they convey, all this interests IARTEM and its various members.

While there are still cases of resource scarcity and others where abundance prevails, in many situations, the teacher no longer relies solely on the imposed or chosen textbook, but on multiple resources that he or she selects, creates or modifies, according to his or her tastes, skills, interests, philosophy of education… In that case, we could almost say to each teacher: *show me your educational resources, I will tell you who you are*. Nevertheless, there are some places where the printed textbook is the unique resource available to teach and learn the school disciplines.

A BIRTHDAY BOOK…

A birthday is a celebration, an opportunity to take stock of what has been achieved, recalling childhood memories, and projecting oneself into the future.

Could an association like IARTEM celebrate its birthday without producing a book? Certainly not, but making an e-book is in a way an affirmation of continuity while being part of modernity. How to build it? This anniversary is a great opportunity to bring together all the people who have participated in IARTEM's activities. That is why we have compiled a list of all participants in at least one of

IARTEM's bi-annual conferences. We sent an email to each of them, explaining the book project and asking for their collaboration. We received a response from a significant number of researchers and other professionals who expressed an interest in participating in this project, which allows us to provide a representative image of the work carried out by IARTEM.

WHOSE CONTENT REFLECTS THE DIVERSITY OF RESEARCH AND STUDIES CONDUCTED AT IARTEM

This book is structured in three parts.

The first one is devoted to the association itself. Contributions recall the different stages of its construction, from the first beginnings at the end of the 1980s, to the trends that have emerged and the challenges that have been met, to its recent developments and international growth. And, as an association is nothing without the engagement of its members, we gave the floor to members who wished to speak. A set of testimonies shows the diversity of the members and their links with the association. These testimonies come from all five continents, which gives an overview of the association's international audience.

The second part, much more extensive, reports on the productions of IARTEM members. It is a key point for IARTEM to organise interlocution between researchers and all the actors working on the design and dissemination of educational resources. The texts produced are on the one hand scientific texts, and on other hand, expert texts (texts written by experts in the field, but not included in universities). Three main themes have been chosen in this part.

The first one is evaluation or assessment. While in previous decades, understanding the functioning of textbook approval systems was central, progressive forms of deregulation increasingly lead to the selection of resources being entrusted to the teaching profession, individually or at the school level. How teachers conduct this work, in countries where legislation has changed, is important to study.

The second theme is broader and covers school subjects and teaching and learning processes: music, history, natural sciences and physics, teacher training, adult education, but also the place of diversity and multidimensionality in textbooks.

The third theme is the production of textbooks and educational resources. How is the publication of manuals managed, whether in the US, Australia, in the Former Soviet Union? But what role do textbooks play in low-income countries? It also shows some initiatives in which production is not the prerogative of the publishing industry, with collaborative forms or teachers who are the authors of their own teaching materials.

The third and last part focuses on some current challenges in the design of educational resources, particularly with the growing development of digital technology, but with a focus on research-based insights.

The first section, entitled "theory and methodology", discusses three complementary research objects around educational resources: a combined approach to the analysis of textbooks, how teachers work on educational resources and how students use educational resources. Thus, beyond the resources themselves, it is the complex processes of teacher design and redesign as well as student appropriation processes that are at the heart of these research streams.

The second section focuses on different challenges that we have to face leading to rethink the design of educational resources with new technologies: reinventing textbooks, more flexible, with a dynamic interface, a design for students' learning… or reinventing schools?

MOVING FORWARD

Many present a future in which digital technologies will be omnipresent and gradually make paper disappear. While the social use of digital devices has taken on considerable importance, we can see that paper remains present and that multiple hybridizations are taking place. The scenario of paper disappearance seems unlikely. IARTEM must conduct research on all forms of educational resources, digital or not, in order to make the current transformations understandable.

Supporting research projects, and notably participative research, is a strong perspective for IARTEM. This will facilitate establishing solid links with other international communities and international institutions.

So confidence is in order for the next 25 years. Let us look forward for the 50th birthday of IARTEM.

Jesús Rodríguez Rodríguez
Tânia Braga Garcia
Eric Bruillard

PART 1

IARTEM, AN INTERNATIONAL ASSOCIATION

A. RETROSPECTIVES

VENTURE TO THE INTERIOR
SOME NOTES CONCERNING OUR PRELIMINARY EFFORTS

EGIL BØRRE JOHNSEN

The strong and steadily more prosperous Norwegian Association for Non-Fictional Writers established a section for textbook authors early in the 1980s. As head of the section, I was frequently confronted with the same type of questions: But what kind of literature, then, is the textbook?; Why are textbooks never or seldom mentioned in the school curricula?; Why do neither pupils nor grownups remember the names of textbook authors?; - and, of course: Do we really need textbooks?

We did have answers, of course. However, they were casual creations of our own, based upon personal experience, a seminar now and then and – most rarely – a newspaper article on the subject. In the Nordic countries, we had no decent source or reference; no theory discussion, no scientifically founded starting point.

By the end of the 1980s, I finished my career as a textbook writer. I no longer wanted to write textbooks, mainly for reasons having to do with my publisher's school book policy. I wanted to write about them, to cope with questions that I for so long had been unable to answer. Well-selling textbooks covered my expenses the first year and a half. However, in 1990, the Norwegian Research Council granted me a scholarship for three years. Thus, I was humbly approaching the proud, but to me unknown status of a textbook researcher.

And I knew exactly where to begin. In 1988, something important had happened in Sweden. Staffan Selander published his book *Lärobokskunskap* (*Textbook knowledge*), an introduction to textbooks both as a literary and pedagogical phenomenon. For me, this publication provided the necessary confirmation. Selander proved that a form of literature as modest as that of schoolbooks was also fully worthy of thorough studies.

I hurried on to publish my book Den skjulte litteraturen (The hidden literature) already one year later. A second edition of my book made it clear that I was far from the only one who wanted to learn more about these forgotten everyday texts. So I made contact with Staffan Selander and visited him for the first time in Stockholm in 1990. On the day of my arrival, I attended a most suggestive seminar guided by Staffan. Together with colleagues and students he was working to establish preliminary approaches to a systematical study of pedagogiska texter (pedagogical texts).

This meeting was the beginning of a rather intense collaboration which culminated a few years later, with the foundation of our international association. However, I dare say that the IARTEM spirit was conceived long before that. Already in 1987, Staffan had succeeded in creating a periodical (*Spov*) edited with support from the Stockholm and Härnösand university colleges. Researchers from all the Nordic countries contributed to the publication, which was to be followed up by Staffan's development of *PEXU* – a network for the study of pedagogical texts and the understanding of curriculum content. In the first PEXU newsletter, dated June 1990, Staffan wrote:

> *From the beginning only Swedish researchers were involved. However, gradually researchers from other countries have shown their interest in the topics studied and the field of research – except the Scandinavian countries researchers from the US, UK, Canada, (West) Germany, Austria, France, Spain Czechoslovakia have paid attention to the network.*

The following up was, of course, inevitable. In November 1991 the first international PEXU-conference took place in Härnösand. In the years to come, it took place in Finland, Denmark, Norway and again in Sweden. The more formal establishment of IARTEM was accomplished at a meeting in Oslo in 1994. But what's in a name? As a matter of fact, the IARTEM was born in Sweden in the 1980s and finally consolidated, I would say, at the conferences in 1991/92.

On the list of participants at the first meeting in Härnösand, we already find names that were to leave significant marks on the development of IARTEM. Among them were Richard Bamberger (Institut für Schulbuchforschung, Vienna), Alain Choppin (Institut National de Recherche Pédagogique, Paris), Karl-Peter Fritzsche (Georg Eckert Institut für Schulbuchforschung, Braunschweig), Marja-Liisa Julkunen (University of Joensuu), Staffan Selander (then the University of Uppsala, later the University of Stockholm), Peder Skyum-Nielsen (Pedagogical High School of Copenhagen), Egil Børre Johnsen (being more of a writer than a scientist, I did not represent any institution). This group of persons came to constitute, later, the provisional executive committee necessary to the foundation of IARTEM.

So many other exciting names from the Härnösand conference ought to be mentioned – they do illustrate the depths and variety of our already then most vital *milieu.* I pick some names and their fields of interest to underline this:

Hélène Huot from France (textbooks and institutional organisation), Jan Mikk from Estonia (schoolbook syntax), C. Cherryholmes from USA (pragmatism and rhetoric in textbooks), C. Stray from GB (the historical sociology of textbooks/ PARADIGM study group), Günther Kress from GB (structures of visual representation), Theo van Leeuwen (the value of diagrams, maps and charts).

These people were pioneers who might deserve each one their own biography. Since there is no room for that here, I choose another solution, presenting two now deceased members: Dr. Alain Choppin and Dr. Richard Bamberger. Their impact on the IARTEM development was of considerable importance. At the same time, they represent two very different starting points and attitudes. I also choose them because I had the honour of "recruiting" them for the association. While Staffan was the undisputed motor – the heart and soul really – of our endeavour, I contributed by looking for colleagues outside Scandinavia. Later, some of them became my friends. So here are two of them, Alain and Richard.

ALAIN CHOPPIN

I came to know Alain Choppin (1948-2009) rather by chance. A friend who for some years studied history in Paris, had a selection of publications, *Histoire de l'Éducation*, published by l'Institut National de Recherche Pédagogique in Paris. I looked rapidly through some of them, and stopped when the following title appeared: *L'Histoire des manuels scolaires: une approche globale.* I started reading, and having finished, started reading again. I was captured – by the author's insight, by his convincing line of argument, and not least by the elegance of his style. I remember thinking that for once I had come to find a text combining the acknowledged French logical clearness and the best of British essayistic tradition.

This article, this piece of revelation was of the utmost importance for my decision to try and learn more about what scientists had thought and written about textbooks. However, I read this in 1988 or 1989, while the article was published in 1980. I had made the acquaintance of a forerunner, to whom I immediately sent a letter, whereupon he – also immediately – invited me to come and see him in Paris.

We met at the Institut National de Recherche Pédagogique (INRP), where Alain had been working as *maître de conférence* since 1979, and where he was employed until his death in 2009. Already during his first year there, he started developing the *Emmanuelle* program, a computer-based project meant to register all textbooks edited in France since 1789 (!). And he succeeded. *Emmanuelle* was the first survey of this kind in the world and inspired, over the years, similar initiatives in countries like Spain (*Red Alfa Patres-Manes*, collaborating with Belgian and Portuguese researchers), Italy (*Edisco*), Brazil (*Livres*), and Canada (*Manscol*).

However, the enormous enterprise of *Emmanuelle*, demanding unusual efforts in the field of quantitative research, was but one side of Alain's contribution to the world of textbook knowledge. Collecting and systematizing was one thing – and a very useful one, as it turned out. For with this gold mine of data at his disposal, Alain was able to convey new insight and approaches to ongoing textbook discussions and research. He published book after book influencing writing as well the as the edition policy in France. Best known is *Les manuels scolaires. His-*

toire et actualité (1992). Having started by analyzing the complexity of textbooks as a source for historical knowledge, the author goes on to present an overview of recent textbook research into the matter (including an important bibliography). Here, he compares two approaches. On the one hand, he attacks a traditional, nationally based form of research with the acceptance of textbooks as true and efficient witnesses of the world and its past. On the other hand, he proposes – no, demands – a global approach comprising the entire educational context: A satisfactory content analysis cannot overlook pedagogical, sociological or literary aspects.

This book, a classic in the history of modern textbook research, was far from the final expansion and strengthening of the program lanced by Alain already in 1980. His article in the collection published by Éric Bruillard in 2005, *Manuels scolaires, regards croisés*, should have been translated into a more available language long ago and promoted as compulsory reading for writers, editors and teachers. I quote from this article, risking a translation from French:

> The accomplishment of a textbook program now turns out to be a compromise of structural/logical considerations, economic regards and the pedagogical and didactical reasons concerning each different subject. This compromise restricts the initiative of the writer, leaving him or her with a certain bitterness *("quelque amertume")*.

Alain never left this perspective during the three years of work that life granted him after 2005. In 2008, *l'Histoire de l'Éducation* printed his fifty-page long article *Le manuel scolaire, une fausse évidence historique.* It is a most worthy, representative, readable and instructive document, demonstrating Alain Choppin's masterliness in the field of textbook research.

There is not enough space here to present his heavy contributions to our IARTEM conferences, but I should add (as if that really is necessary) that Alain, *Le Parisien*, spoke excellent English.

So many meetings, so many talks. I remember the 14th of February 1994, the day when we constituted the first preliminary board of IARTEM in Oslo. Alain joined me on the train down from Holmenkollen hill, and I read aloud for him from a local paper. During the night, the famous painting by Edvard Munch, *The Scream*, had been stolen from our National Gallery. Alain seemed to take enormous interest in the happening, and I remember thinking that he might very well have been responsible for the investigations to come. The spirit, the feeling, the temperament, the nerve, the brains, the wits – it was all there.

Not long after Alain Choppin's death in 2009, Paolo Bianchini (University of Torino) wrote an obituary in his honour. I take the liberty of quoting from the end of his article (translating from French into English):

Even if the existence of his works can accompany us and guide us for a long time, nothing really can make up for the void that the loss of him has left in the heart of his colleagues, the loss of a severe and stern historian, but above all of a friend in whose company you always felt so well.

I worked in Paris for some years and still can not stop visiting this city. I have no doubt as to when and where I spent my best moments there. It was with Alain, in one of the small streets behind the INRP-building in rue d'Ulm, close to the Fondation Curie. We went there for lunch – une entrecôte frites et un quart de rouge. And *Emmanuelle* was with us, and the world of textbooks; at the distance of one arm's length.

RICHARD BAMBERGER

I first met with Richard Bamberger (1911-2007) shortly after I made the acquaintance of Alain Choppin. The Austrian's age was then twice that of Choppin. However, age was never a matter of worry or concern to the man from Vienna. If the IARTEM-meetings had taken place even in a modest tent on the Siberian steppe, he would have been present, with at least two papers at hand. (They write textbooks in Siberia too, you know. And Bamberger published his *Lehrbuch der russischen Sprache* already in 1946.) His enthusiasm was as strong as that of Alain Choppin. But except for that, they were opposites, thus demonstrating the scope of our group.

Choppin was an academically well trained historian; Bamberger a well trained teacher. Choppin's ambition was to overlook and analyze a connected whole of pedagogical literature. So was the aim of Bamberger, but he narrowed his point of view down to one item on which he continuously and untiringly kept insisting. Choppin worked with a team of colleagues at the INRP and from elsewhere in France. Bamberger was a well known profile in his field, in Austria and Germany as well as in the US. But in his everyday work, he was much of a loner; the textbook work taking place in Vienna was mostly his and his alone.

Bamberger made a career first of all as an editor of children's literature and became well known throughout Austria for his encyclopedia work – *Österreich lexikon* (1966)*, Die Kinderwelt von A-Z* (1980). Incomes from these publications enabled him to create his own Institut für Schulbuchforschung in 1988. This one man establishment was a direct consequence of his preoccupation with children's literature: Why were they so easily attracted to fairy tales and fiction, whereas so many of them turned their backs on textbooks?

During my first visit in Vienna, he demonstrated this by taking me angrily through a history textbook crammed with information: "Das grösste Erziehungsverbrechen unseres Jahrhunderts," he said and found a book with essays by Austria's most important female writer, Gertrud Fussenegger. I read:

> Even the most interesting information has no value if it is conveyed in insurmountable portions. An example: A geography textbook for eleven year old students consists of 200 pages. Each page contains an average of ten proper names; countries, rivers, towns, exotic products, no longer existing nations. Which gives a total of more than 2 000 names. Let us then consider the fact that a normal adult person disposes of an everyday vocabulary between 2 000 and 3 000 words. This comparison is all you need to understand the monstrosity of what is going on. (My translation from German.)

So Bamberger started counting. He developed the most intricate systems for the evaluation of textbook accessibility, analyzing vocabulary and syntax in a tremendous quantity of textbooks for primary and junior secondary schools. The key words were reading motivation and reading competence. His motivation for gradually putting the children's literature aside and devoting himself to textbook research was the observation of one, detested schoolbook tradition: Overburdening.

He presented paper after paper supporting his point of view, as well as numerous articles and letters. Yes, letters. So to whom did he write? He wrote to everyone – most every post box in Austria was familiar with his envelopes. He wrote to fellow researchers, and he wrote to any *Bundesminister*, continuously stating that something had to be done. And he really did not lack ideas as to just that. At the IARTEM conference in Oslo in 1997 he was 86 years old. He then presented, with usual emphasis and pith, a paper entitled *Increasing the achievement and motivation level of reading and learning under the motto of "Reading and learning Olympiad"*.

One might say that Richard Bamberger's important achievement was of a rather one-tracked character. However, his awareness of the value of public attention ought to be underlined here because it points to the shortage of immodesty in the research milieu. What is the use of demonstrating new and fertile knowledge if it is not communicated to, and appreciated, by writers and editors?

The last question brings me to my own role during the first IARTEM years. I was not – and still am not – a textbook researcher in the strict meaning of the word. I have never dedicated months to a thoroughly methodological study of the structure or effect of one or more chosen textbooks. My papers and lectures have primarily aimed at mediating insights from other researchers; a mediation applied more or less systematically on both olden and recent Norwegian textbooks. In my amateurish writer's way I share Choppin's desire to gain insight, and I share Bamberger's desire to arouse. In addition to Staffan they were, and are, my mentors.

So I managed to add, after all, one not unimportant contribution to our efforts. It all started with the paper Staffan presented in Härnösand in 1991, *Pedagogic Text Analysis – some notes.* He divided his presentation into four parts:

- Macro-structures and orgnizational framing,

- Social organization and individual horizon,

- Pedagogic text as an object,

- Pedago*gy*.

These perspectives formed the basis of an ambitious project. I started collecting every available piece of information on textbook literature in Europe and the US. In 1993, the Scandinavian University Press published my *Textbooks in the Kaleidoscope. A Critical Survey of Literature and Research on Educational Texts.* The book did cover, I think, the most important results and trends in textbook literature and research published up to then in Danish, English, French, German, Norwegian and Swedish. The survey is divided into three main sections: historical and ideological research traditions, the use of textbooks, and the development of textbooks

I also included a chapter on the registration of textbooks as a basis for analysis, as well as a discussion of the conditions for textbook science as a discipline in higher education. In the preface, I wrote that the project might be viewed as "a preliminary part of the efforts being made in several countries to determine what must be done to win recognition for textbook research as a separate college or university discipline".

To a certain extent, this goal has been reached in several countries (see the account from Staffan Selander and Susanne Knudsen). However, I finish this article by repeating my question: What can be done to put our insight into action? I am very fond of a sentence uttered more than once by Richard Bamberger: "We cannot change the attitudes and ways of one hundred teachers overnight. However, you *can* change one million textbooks." However, further questions have to be added. For, as Peter Fritzsche from Braunschweig and Magdeburg has put it: The condition for changing textbooks is the change of the awareness of authors, editors, politicians and others.

Once again, I thank Staffan and the others for having been included in the IARTEM society. I am also grateful for the support from the Norwegian Research Council and the textbook section of the Norwegian Association for Non-Fictional Writers.

LEARNING RESOURCES AT STAKE. MAIN TRENDS AND NEW CHALLENGES IN RESEARCH ON TEXTBOOKS AND EDUCATIONAL MEDIA

SUSANNE V. KNUDSEN & STAFFAN SELANDER

A BACKGROUND TO IARTEM 1988–1991

From the very beginning, IARTEM grew out of a vision to combine Nordic research on textbooks with an international focus. In 1988, an institute for pedagogical text research ("Institutet för pedagogisk textforskning") was established at the Mid-Sweden University College (now Mid-Sweden University) in Härnösand. Staffan Selander was responsible for this new research with a focus on "pedagogic communication and content analysis" (c.f. Selander 1988). A network (PEXU) with (Nordic) researchers that in different ways studied pedagogic texts was also established, and contacts with Georg-Eckert Institut für internationale Schulbuchforschung in Braunschweig, l'Institut National de Recherche Pédagogique in Paris, the American Textbook Council in New York, and Japan Textbook Research Center in Tokyo were initiated.

Thanks to this new network, we were able to identify several very interesting approaches to text and textbook research – e.g. historic, pedagogic, subject-didactic, linguistic and multimodal approaches – so we started to plan for an international conference in Härnösand in 1991. This became the very first start of IARTEM, although IARTEM as such was not formalized until later. This conference was truly international, with 20 researchers from not only Sweden, Denmark, Norway and Finland, but also from Germany, England, the Netherlands, Canada, and Australia. This was a small, intense conference, out of which grew the idea to create a new international research network.

THE FORMATIVE YEARS 1991–1995

After the international conference in Härnösand, the next conference was organized in Finland in 1993, and the discussion to establish an international organization was taken a step further. At the time, something new was emerging – the digital world of information and communication. Internet was born in 1994, but very few could imagine its consequences for information storage and communication. It took another ten years before Web 2.0 was introduced, with its impact on 'everyone's' possibility not only to consume information, but to create information as well.

A very lively discussion begun between those who wanted to focus on printed textbook research, and those who wanted to extend the research to digital educa-

tional media. These discussions also entailed questions concerning both the theoretic foundations of this research, and its empirical research strategies. During the 1990's, a Centre for Pedagogic Texts and Learning Processes was also established at the University College in Tønsberg, Norway, which became the first important basis for the administrative work of IARTEM during the formative years.

At the following conference in Skælskør, Denmark in 1995, with participants not only from the (Western) European and Nordic countries but also from Bulgaria, Estonia, Israel and Japan, IARTEM was formally established with bylaws and its first president, Egil Børre Johnsen (1995–1997). Hereafter, conferences were organized every second year: Oslo (1997), Utrecht (1999), Tartu (2001), Bratislava (2003), Caen (2005), Tønsberg (2007), Santiago de Compostela (2009), Kaunas (2011), Ostrava (2013), Berlin (2015), and Lisbon (2017).

Santiago de Compostela

In 2002, IARTEM also started bi-annual mini-conferences outside Europe: Sydney/Australia (2002 and 2004), Seoul/South Korea (2006), Antananarivo/Madagascar (2008), Montreal/Canada (2010), Curitiba/Brazil (2012), Pereira/Colombia (2016) and Argentina (2018). With 130 circulating participants in Curitiba, it was decided to designate the conferences in equal years for regional conferences. After this conference, Spanish was added to English as the main spoken languages. This was already in use at the conference in Spain and used in the 2009-volume.

Madagascar-cake

Dr. Deise Cristina de Lima Picanço (Deputy Director of the Education Sector /UFPR), Dr. Tânia Maria F. Braga Garcia (President of the Regional Conference) and Dr. Susanne V. Knudsen (IARTEM President). Conference Close, August 31, 2012. Universidade Federal do Paraná, Curitiba, Brazil.

IARTEM PUBLICATIONS

The first IARTEM publication was *Textbooks and Educational Media. Collected papers from 1991–1995*, edited by Staffan Selander (president 1997–2005). The following conference-books were then published:

- *New Educational media and textbooks* (Utrecht; edited by Staffan Selander, Marita Tholey & Svein Lorentzen)

- *Learning and Educational Media* (Tartu; edited by Jaan Mikk, Veijo Meisala, Hasso Kukklemelk & Mike Horsley)

- *'Has Past Passed'? Textbooks and Educational Media for the 21st Century (Bratislava;* edited by Mike Horsley, Susanne V. Knudsen (president 2005-2013) & Staffan Selander)

- *Caught in the Web or Lost in the Textbook* (Caen; edited by Eric Bruillard, Bente Aamotsbakken, Susanne V. Knudsen & Mike Horsley).

- *Peace, Democratisation and reconciliation in Textbooks and Educational Media* (Tønsberg; edited by Mike Horsley & Jim McCall)

- *Local, national and transnational identities in textbooks and educational media* (Santiago de Compostela; edited by Jesús Rodríguez Rodríguez, Mike Horsley & Susanne V. Knudsen)

- *Representation of Otherness* (Kaunas; edited by Natalija Mazeikiene, Mike Horsley & Susanne V. Knudsen)

- *Textbooks and Educational Media in a Digital Age* (Ostrava; edited by Zuzana Sikorova, Mike Horsley, Tânia Braga Garcia & Jesús Rodríguez Rodríguez)

In addition, the various mini-conferences have resulted in publications. As can be noticed, there are some prevalent themes: textbooks and educational media, identity formation, and learning. In the following, we will comment a bit more on these themes. But let us not forget that an IARTEM e-journal was also established, and its first issue was published in 2007 with Mike Horsley as chief editor (the president 2013–2016) together with Jaan Mikk (the vice-president 1997–2005).

Since 2013, IARTEM also established a PhD-course, where students present their research and are supervised by members of the IARTEM board.

RESEARCH ON TEXTBOOKS AND EDUCATIONAL MEDIA

Research on textbooks has been conducted in Germany since the late 1940s and codified by The Georg-Eckert Institut für internationale Schulbuchforschung in Braunschweig since 1975. Through the years, IARTEM has cooperated with the institute, which has collected school textbooks from all countries and continents – a world-famous collection that covers the historical development of school textbooks.

Since the start of IARTEM, research on educational media has been pushed into the foreground. As the 2002 conference volume ("Learning and Educational Media") documents, most research still focussed at that time on printed textbooks. The first part of the publication – "Textbooks and curricular reform" – and the third part – "Values in textbooks" – entailed 18 articles, whilst the second part – "New educational media" – only had four articles. The articles about educational media covered both general reflections concerning the use of internet in schools and computer literacy, and more specific topics such as the use of internet in Biology and Geography or the use of electronic textbooks in Mathematics, Chemistry, History and Geography. Under the headline "Learning environments", there are presentations of the old educational media (school radio programs) and the new educational media (chat on the internet).

This reflected the rather premature stage of digitized media at the time. But, as professor Hiroshi Nakajima underlined: "Of course, we know that it is a big task to bridge the digital divide internationally as the OECD urges, and this goal has to be applied in schools. It is not possible to consider future educational progress without the Internet and other new educational media." (Nakajima 2002: 80-81).

With the question "Has Past Passed?", the conference in 2003 challenged us again to reflect on the transition to a digitized world: "Textbooks and Educational Media for the 21st century". It was a brilliant question: Were school textbooks

outmoded, or did they still play a dominant role in schools? However, it was also a rhetorical question. In the introduction to the publication from the conference the editors state: "From the very beginning the focus was on textbooks, and textbooks do still play an important role in most countries around the world." (Horsley, Knudsen & Selander 2005:4) In other words, research within IARTEM followed the international practices in schools. In spite of this, the articles show a growing interest in educational media without losing sight of the role of printed textbooks. Here we find articles about electronic textbooks and electronic resources, such as computer game, CD-ROM and educational produced websites, as well as research on the interaction between textbooks and digitized learning resources. It was also apparent that there was the lack of terminology in relation to the analysis of digitized media: "The lack of clear and consistent terminology in the field of educational technology. Problems and solutions arising during a case study" (Rodríguez Rodríguez & Montero Mesa, 2005: 121 ff).

The title of the conference 2005 – "Caught in the Web *or* Lost in the Textbook?" – continued to follow this ping-pong movement between textbooks and educational media, and put the following questions at the fore: Will it be relevant to choose digitized media at the expense of printed textbooks, when many countries still have no digital infrastructure? It was at this time not clear what competence new producers on the digital educational market really had, nor the economic consequences for the established publishing houses, who already had invested a huge amount of money in this new trend (as it was seen) without yet getting anything back.

The following mini-conference in Seoul was, interesting enough, oriented towards the use of internet in school and higher education. The conference took place at a university, which exclusively focussed on internet-based mass-education.

The conference in 2007 highlighted the interaction between textbooks and educational media in the call for workshop papers, for example "The balance between textbooks and educational media", "The use of textbooks and educational media" and "Approval, selection and language policy in textbooks and educational media". Again in 2013, the conference's title pointed towards "Textbooks and Educational Media – with the addition "in a Digital Age".

In conclusion we could say that the research on these themes – within the frame of IARTEM – mirrored the gap between prevailing school practices and the new hopes (and fears) of digitized technologies. However, today the digitized world has exploded with new kinds of apps, games, and simulations, as well as with new 3D-technologies, virtual reality, MOOCs (Massive On-line Open Courses), big-data and data-mining that can use a huge amount of data to create cognitive patterns of students work, digitized debate technologies and new kinds of collaborative work for information seeking and so on. This technological develop-

ment might even lead to new ideas about teaching and learning and new ways of organizing schooling. Furthermore, it also affects the change in understanding of what "a text" might be – i.e. not only something written down or printed, but in a wider sense it can be seen as resources for meaning-making and learning, where the combination of different modes and media offer new challenges for our understanding of how messages (information) are interpreted and used (Insulander, Lindstrand & Selander 2017; Kress & Selander 2012; Nouri, Åkerfeldt, Fors & Selander 2017; Selander 2015).

FROM TEXT TO TEXT PRACTICES

This headline addresses two research themes: one that is inspired by reader-response theories, and one which is preoccupied with classroom observation. The first theme can be read in articles with analyses of the interaction between the reader-in-the text, the so-called model reader and the authentic reader in the classroom. With the model reader as a theoretical inspiration from Umberto Eco and Wolfgang Iser, the focus is on textual positions: What can textbooks and educational media teach the pupils about democracy, for example in relation to WW2, or identity/-ies, or about mathematical problem-solving. The model reader can also be used to study how textbooks and educational media can function as learning resources (or not) by way of narratives, metaphors and symbols, or graphic figures and pictorial illustrations.

Focus on the authentic readers/the pupils response to learning materials have been inspired by the American researcher in literature Stanley Fish's article "Is There a Text in This Class?" He concludes that in a classroom, there will be as many texts as readers. Each reader will have his/her own reading. The Norwegian researcher Bente Aamotsbakken has elaborated on Fish's question and conclusion with the concept of "extra-text": "This is a text created within the student's mind, nourished by his imagination and accompanied by his various experiences with other texts or expressions of art …" (Aamotsbakken, 2006: 103). The extra-text can also result in an interpretative community, where the readers meet in a common reading of a given text. In the interpretative community, the interaction between the model-reader and the authentic reader has been elaborated by Susanne V. Knudsen with the concepts of the conforming reader/the confirmed reader, the exploring reader and the confronting reader/the confronted reader – as different ways of realizing the text among the pupils in the classroom (Knudsen & Aamotsbakken, 2009). The relation between written text, lay-out and pictorial illustrations is also an important question in multimodal, social-semiotic research (Danielsson & Selander, 2014, 2016; Kress & Selander, 2012).

The second theme, classroom observation, has been discussed and highlighted through IARTEM, but the findings are relatively poor if we go through

the publications. It does not mean that they are not there or outdated. However, most research on working with texts in textbooks and educational media has been conducted in small enclaves with one or two researchers. Research in classrooms takes a lot of resources. Therefore, we typically find them in governmental financed projects running two to four years and in doctoral dissertations. Within this theme, the researchers give didactic approaches, inspired by the concepts of formal and informal learning, collaborative learning and remediation of learning.

RESEARCH ON IDENTITIES

The titles of the 2007–2012 conferences show an orientation towards identities – democratic development in relation to issues like nationality, gender, ethnicity and social background. The conference in 2007 signaled the focus with the title "Peace, Democratization and Reconciliation in Textbooks and Educational Media". This was followed up by the mini-conference in Madagascar 2008, entitled: "Understanding and Improving the Role of Textbooks and Educational Media in a Resource Challenged Environment". As the organizer Micheline Raked from Madagascar stated: "To talk about development of educational material in Madagascar as a resource poor environment was until recently forbidden, because it focused on the negative side of the school situation." (Knudsen, 2008). The conference itself was a crossroads between different cultures and contexts. In Europe and Australia, we could find many examples of new textbooks and new educational media, where most of the Madagascan textbooks were few and directly translated and transported from France. The use of electronic media in Madagascar was unusual, simply because of the lack of electricity. The Madagascar participants were mainly teachers, and there interests were gathered in the sub-themes: How can textbooks (and educational media) be used effectively in African learning contexts; How can materials designed for well-developed countries be adapted for use in a resource-poor environment; In what ways do textbooks (and educational media) help improve students' performance in the classroom; The importance of quality, evaluation and selection of textbooks and educational media.

With the 2009-IARTEM conference in Santiago de Compostela, the matter of identity was highlighted in the plural: as the title says, it was about "Local, National and Transnational Identities in Textbooks and Educational Media". In the introduction to the publication, the editors underlined the following: "The consequences of crossing cultures between local, national and transnational identities are of increasing interest, not least in terms of education. In a world of globalization and extended migration, a new understanding of 'identity' emerges. The increasing interest in local and national cultures must be met with an expansion of transnational understanding in education – education as reflected in textbooks and educational media." (Rodríguez Rodríguez, Horsley & Knudsen, 2011:11; also see Lindstrand, Insulander & Selander 2016).

The 2010 mini-conference in Montreal focused on "Constructions of Conflict and Peace In/By Text". The volume from this mini-conference was published in 2016 with the title "Representations of Minorities in Textbooks: International Comparative Perspectives" (published on IARTEMs website). One of the paper presentations at the conference gave an interesting insight into how a researcher's life "as researcher" could be in danger. S/he had analysed how Iranian textbooks promoted a picture of religions other than Islam. "The Other" is seen as an enemy, and the Islamic religion is glorified by its contemporary – as well as historic – martyrs. The researcher presented him/her-self at the conference with the given name, but the research as such was published under a pseudonym. Another (African) researcher talked about "wobbling" between loyalty to the contemporary nation-state and the background of being a white African. He had for example observed a teacher who taught the history of Nelson Mandela. The textbook talked about a hero, whereas the teacher presented Mandela as a terrorist.

The following conference, 2011 in Kaunus, was entitled "Representations of Otherness". It focused on minorities as the introduction says: "Otherness is something 'other' that is seen from a specific, central point of view, be it political, sexual or cultural." (Mazeikiene, Horsley & Knudsen, 2013:5). Furthermore, it is emphasized that otherness can be discussed "in terms of ethnicity, race, the nation, gender, class and religion as well as in relation to majorities and minorities." In a workshop with the same title as the conference, the participants discussed how different identities of indigenous people had been constructed in Australian teaching and learning materials.

At the 2012 conference in Curitiba with the theme "Challenges to overcome social inequality: the role of textbooks and educational media", social inequality was related to the Brazilian school culture. Brazilian textbooks in public schools are provided by the National Program of Textbooks and linked to the very assessment process used in this program. Social inequality was also illustrated by the rapidly expanded distance learning programs. This theme enabled a dialogue concerning learning resources in different Latin American countries and different Brazilian states.

WHAT DOES IT TAKE TO CREATE A PRAXIS-ORIENTED RESEARCH FIELD

We have here pointed at some main themes in the research carried out by members of IARTEM and presented at different conferences all over the world: printed texts and educational media, school textbooks vs learning resources, different ways of understanding 'text', and questions of democracy, gender, social differences and 'otherness', and texts and assessment grids vs a broader understanding of cultures of recognition. If we wish to develop text research as a praxis-oriented research field,

it seems inevitable to take into consideration both theoretic and practical demands. Theoretic demands embrace such aspects as theoretic grounding, theoretic development, methodological soundness, theory-related, analytical categories, and a critical eye (cf. Selander, 1990). Practical demands, on the other hand, focus on research that seems relevant and understandable, action oriented, and possible to use within a limited period of time. It is not always easy to carry out all this at the same time. However, we can find many examples of action- and/or design-oriented approaches which are based on theory and at the same time oriented toward a change of some sort.

Textbooks on textbooks and educational media seem to embrace both the question of how texts (in its wider sense) *for* learning are constructed and function in educational settings, and how they function in use, *in* learning. Thus, this theme of designs *for* and *in* learning (Selander & Skjelbred, 2004; Selander, 2017) is related to the research on *texts* (for reading) and *extra-texts* or the text that the reader constructs (Aamotsbakken, 2006).

The focus on text as a product has also over the years been related to different kinds of text-practices and different ways of reading (and using) texts. As has been pointed out, it is very time-consuming to study text-practices in school, even though much interesting information can be gathered, both from close-up studies with filmed sessions and more overarching quantitative studies. A new approach focuses on collaborative, design-oriented work between teachers and researchers, where for example teachers construe scenarios and design-patterns for (for example) the use of digital technology in the classroom (c.f. Knutsson & Ramberg 2018; Mor & Winters 2008).

Through the years, there has also been an increasing awareness of how theoretical perspectives matter for the empirical research. The field as such – textbooks and educational media – is not a coherent field of research, and perhaps should not be. We can here meet linguists besides subject-oriented researchers, educational research along with multimodal, social semiotic research etc. Dominant approaches have followed the main trends in Anglo-American-Australian theories: critical semiotics inspired by Marxism and feminism, multimodal social semiotics and critical discourse theory inspired by Michel Foucault and Michael Halliday, furthermore Niklas Luhmann's social systems theory, hermeneutics inspired by Paul Ricœur, rhetoric theories, and social constructivist theories connected to learning.

However, if we look at the IARTEM conference publications, theoretical reflections seem to be rare. Theory (and theoretic positioning) is usually briefly presented at the beginning of an article, but not always clearly related to the following analysis of the empirical results. As presidents of IARTEM, we both had to argue hard at the board meetings to include theoretical sessions at the conferences, which interesting enough often ended up with an alternative school visit during the same hours as the theoretical sessions. And when we called for papers

to the conferences, very few applied for theoretical – or methodologically oriented – presentations. In the conference volumes from 2005–2011, you will find mainly presentations of theories connected to minority cultures and identities (intersectionality), multiculturalism, citizen development, power, learning experiences and learning materials and reader-response theories.

In other words, empirical studies are the most visible in the conference volumes, as they were at the conferences. The same trend can be found in the IARTEM e-journal. Articles cover a broad variety of gateways connected to different subjects (like Mother tongue language, Geography, History, Foreign language, Social study, Mathematics, or Science) and are connected to focus on verbal and visual representations in textbooks and media.

Most of the empirical research are also nationally oriented. Comparative research across countries and continents have been implemented as reflected by the title "Local, National and Transnational Identities in Textbooks and Educational Media" (Rodríguez Rodríguez, Horsley & Knudsen, 2009). However, this volume has very few examples of comparisons between countries. The examples are two European projects: a study of textbooks in East and West Germany from the mid 1960's to 1990, and a study of maps in German and Romanian geography textbooks. There is only one study across continents (Australia and Europa/Finland). As a kind of outcome from IARTEM, you can find publications with a comparative aim, for example *Nordic identities in transition – as reflected in pedagogic texts and cultural contexts* (Selander & Aamotsbakken 2009; Selander, 2018), and *International Research on Educational Aids: A Status of Knowledge* 2000-2011, with contributions mostly by IARTEM members, presenting research in 11 countries and three continents, carried out on behalf of The Norwegian Directorate for Education and Training, published in Norwegian, presented in a short version in English and Portuguese (Knudsen, ed. 2011, 2013).

So, even if the field of research on textbooks and educational media is divided in many senses, it seems that for the future a greater consciousness concerning theoretic and methodological matters are not only relevant but also necessary to carry out if the field is to expand. We think that this is a necessary complement to the kind of knowledge that each one of the researchers are already aware of. Having said this, we also would like to argue for more cross-cultural studies, as well as the concern for how to handle increased differences and gaps in our societies, due to new kinds of migrations and immigrations.

The last question we would like to highlight is the importance of practice-oriented research. As we see it, this is not a question of finding best-practices, but to develop an understanding of how knowledge can expand with those who use teaching and learning material, and to understand how this material works in rela-

tion to other resources *outside* the school context used by teachers and students. Eventually, this will also have consequences for how we can develop new "cultures of recognition" (Kress & Selander, 2012) and (for the learner) fruitful ways of assessing learning, and knowledge!

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IARTEM AND ITS INTERNATIONAL GROWTH AND DEVELOPMENT IN RECENT YEARS (2010-2018)

JESÚS RODRÍGUEZ RODRÍGUEZ & TÂNIA MARIA F. BRAGA GARCIA

INTRODUCTION

With its origins in nordic countries, the early years of iartem were conducted with the participation of researchers and other textbook enthusiasts from different countries. As reflected in the early chapters of this book by Susanne Knudsen and Staffan Selander, the main focus at that time was on "pedagogical communication" and content analysis.

In the 1990s, the Center for Pedagogical Texts and Learning Process was established in Tonsberg and, thus, Norway became the reference point for managing the work of IARTEM in the initial years. The conferences held during that decade extended the presence of IARTEM to include other European countries, but there continued to be a predominance of issues regarding textbooks and teaching materials in the contexts of Northern Europe and a few other European and Asian countries[1].

The early 2000's were a period of great development in the activities of the Association. Mini Conferences were held in addition to the biannual conferences, making it possible to open up new discussion spaces in more countries on different continents.

In 2005 a conference in Caen, France, opened up spaces for participation by a significant number of countries in the European context. Among others, the themes of identity, learning process, design, evaluation and materials selection were discussed.

As compared to the previous decade, Conference themes went beyond printed textbooks, especially as a result of the transformations spurred by the use of Information and Communication Technologies.

A review of the Newsletters published on the IARTEM website since 2007 help track some of the changes that have occurred in the Association. Information can be found about courses and meetings that took place in different countries, aimed at training teachers and researchers. For example, the course "Good Books,

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[1] For a deeper understanding of the origins of IARTEM, we recommend reading the texts by Susanne Knudsen, Staffan Selander and Egil Børre Johnsen included in this book.

Bad Books: What makes an effective textbook?" held in Utrecht, The Netherlands. The course leaders were James McCall (Center for Publishing Studies, Stirling) and Arno Reints (CLU, University of Utrecht) and it was meant for education publishers, teachers, education quality managers, ministries of education, and so on.

Another course held in this period was "Basis for the success of textbooks", organized by The Open University Center of the University of Tartu, Estonia. It was an online course (WebCT course via Internet) with Prof. Jaan Mikk and Prof. Anthony Haynes.

These activities are indicative of the Association's concern for contributing to the training of teachers and other professionals involved in school textbooks, especially with respect to evaluation.

Outside of Europe, Madagascar and Montreal hosted Mini Conferences at the end of the decade with the aim of broadening spaces for debate on Textbooks and Educational Media based on local circumstances. The intention was also to promote the formation of new research groups on the subject.

As pointed out by Susana Kudsen and Staffan Selander, teachers were in attendance in Madagascar (it was an atypical congress in this sense). There were a number of questions about local issues: How can textbooks and media be useful in the African context? How can materials be adapted to areas that are poor in resources? To what extent do textbooks and media help improve teaching processes in the classroom? What is the importance of quality, evaluation and selection of textbooks and educational media?

In Canada, a small group of researchers participated in discussions on "Constructions of conflict and peace in/by Textbooks and Educational Media". This meeting subsequently resulted in a 2016 publication with papers presented by researchers from Canada, the United States, Australia, Germany, Norway, Spain, South Africa and Brazil. The book is entitled "Representation of Minorities in Textbooks: international comparative perspectives".

The achievements in this period highlight the efforts made by participants in the initial and consolidation stages of the association, which have produced favorable conditions for its strengthening and development, as will be discussed below.

IARTEM CONFERENCES OVER THE LAST DECADE

To a certain extent, the theme of identity was already on the agenda in the 2000s and was highlighted at the Kaunas Conference in Lithuania in 2011: "Representations of otherness". The meaning of the topic was defined by the organizers of the scientific publication, which expressed it as follows: "Otherness is some-

thing 'other' that is seen from a specific, central point of view, be it political, sexual or cultural. Otherness has been discussed by conference participants in terms of ethnicity, race, the nation, gender, class and religion as well as in relation to majorities and minorities. The conference has focused on the intersection between these socio-cultural categories in textbooks and educational media."

In 2013, a meeting took place in Ostrava (Czech Republic) entitled "Textbooks and Educational Media in a Digital Age." The conference highlighted the following concerns expressed by Eric Bruillard at his conference. He indicated some basic problems with respect to "very rapid adoption", strong expectations, and unconvincing results. He contrasted this with the opening of new education markets. For this researcher, insofar as digital resources, many stakeholders simply prefer to believe that they works and only accept a complementary research model aimed at improving a technology already considered to be wonderful and essential to schools.

Likewise, Arno Reints considered that changes in school education have a great influence on teachers, educational publishers and educational scientists insofar as textbooks and other, especially digital, learning materials. According to this researcher, the main task of educational publishers should be to produce textbooks that support children's learning processes, and, therefore, quality textbooks are those that provide scaffolding for learning. One of the main issues raised by this author is how educational science and educational research can help publishers and teachers develop, select and use quality textbooks.

According to Reints, the vital question is not "what works", but why it works. Moreover, we can only understand the "why" when it is based on a reliable theory and/or model, especially a theory of learning.

In 2015, the biennial Conference was held in Berlin. For the first time in the history of IARTEM, an international conference focused on school subjects, which according to Knudsen and Selander had always in some sense been present in post-conference articles (see chapter in this book). Previously, the Regional Conference in Curitiba had already contemplated this disciplinary organization with topical sessions on disciplines such as History, Languages and Natural Sciences.

At the Berlin Congress, experts in a variety of areas discussed educational media with general education scientists, psychologists, and other interested parties. During this congress, the creation of work groups was proposed within the framework of the different knowledge areas, thus, extending multidisciplinary dialogue within the context of IARTEM. Noteworthy was the work by the IARTEM music group, which together with the Stellae Research Group organized a congress in late January 2019 in Santiago de Compostela. (http://stellae.usc.es/me-dm-symposium/).

In 2017, Lisbon hosted a Conference to discuss the topic of "New media, new schools?". The aim was to open up to the Portuguese-speaking context (especially Portugal, Angola, and Mozambique considering the privileged setting of Lisbon). We can say that this was partly achieved. From the Lisbon conference we can highlight the following: Textbooks and educational media, Different ways of understanding "text", Issues regarding Democracy, Gender, Social Differences and "others", and Evaluation guides.

In Berlin and Lisbon, the Association set goals to expand dialogue with other associations, institutes and networks that focus on the topic of textbooks and educational media, seeking opportunities for joint action. Speakers and participants from the George Eckart Institute were present in Berlin; and a representative from the Spanish REUNID (https://reunid.eu/) network attended the Lisbon meeting. Cooperation agreements were reached with INDIRE from Italy and the George Eckert Institute from Germany.

IARTEM SINCE SANTIAGO DE COMPOSTELA. OPENING UP TO LATIN AMERICA

In addition to spaces for debate on relevant topics in the field of Textbooks and Educational Media, as described by Knudsen and Selander in their chapter, the Biannual Conferences have been a special space for building relations between the Association and a variety of research groups and organizations that work in this area.

To get a glimpse of the road travelled, let us look back at the conference held in Caen, France in October 2005, whose theme was "Caught in the Web or Lost in the Textbook?". The meeting was attended by representatives from Spain: Jesús Rodríguez Rodríguez and Helena Zapico from Santiago de Compostela, and Muhamad Kira from the UNED in Madrid. Their participation contributed to the proposal of holding a Conference in Santiago de Compostela four years later, in 2009, after the conference in Norway (2007) whose theme was Peace, Democratization and Reconciliation in Textbooks and Educational Media.

Thus, in 2009 the University of Santiago de Compostela hosted the biannual conference with the theme "Local, National and Transnational Identities in Textbooks and Educational Media". With about 60 papers presented, this conference demonstrated a concern for opening spaces by presenting papers in a specific session held in Galician, Spanish and Portuguese, in addition to the English-language sessions traditionally held at all meetings.

A number of issues guided the organization. Firstly, there was the need to increase participation by countries on other continents, as well as to promote the presence of researchers from European countries, IARTEM participants and par-

ticipants from previous conferences. With respect to this, speakers included specialists from Spain and Brazil, which had previously only had a small participation at conferences.

With respect to both Spain and Brazil, this small participation did not correspond to the large volume of knowledge produced regarding textbooks and educational resources in a broader sense. The existence of research groups and the production of educational materials, as well as the participation in related collaboration networks were the motivation for holding the Conference in Santiago de Compostela and the way it was organized.

From a social standpoint, though for different reasons, the subject of school books had occupied a prominent place in the written press and other social media in these two countries with respect to the debate on book quality, their presence in family life, and the issue of free textbooks – whether real or desired. Publishers and their responsibility in production and distribution of school books was also a subject for consideration by IARTEM at that Conference.

This meeting gave rise to an important outcome: the opening up of IARTEM to the countries of Latin America. In Santiago de Compostela, a proposal was made for a mini-conference in Curitiba, in the south of Brazil, which eventually took place in 2012 at the Federal University of Paraná. The presence of participants from different parts of the country, as well as from Argentina, Europe and Canada resulted in an academically relevant event that propelled the Association in Latin America. The theme for this mini-conference had to do with the relationship between textbooks, educational media and addressing social inequalities in light of the region's specific challenges.

As a follow up and with the support of IARTEM's Board of Directors, the Center for Research on Didactic Publications (NPPD) at the Federal University of Paraná started disseminating the Association's work in Latin America and initiated collaborative actions. Two additional Regional Conferences were carried out, replacing the idea of Mini Conferences because of the large volume of papers and participants.

The first of these took place in 2016, at the Technological University of Pereira, Colombia, with the participation of students and professors from cities in that country, as well as from various Latin American countries such as Argentina, Chile, Venezuela and Brazil. Also present were researchers from Spain (Santiago de Compostela and Barcelona), Denmark and Norway. Brazil acted as co-organizer of the Conference, repeating the role it assumed at the Berlin Conference in 2015 as coordinator of IARTEM's expansion in Latin America.

A crucial aspect to the Pereira meeting was the issue of transitioning from printed to digital textbooks. A number of fundamental preliminary concerns were

highlighted in the introduction to the conference proceedings. From an economic standpoint, digital materials have been a shock to markets. This is one of the reasons why paper-based publishers have begun to invest considerable sums in the development of electronic textbooks. Access to the Internet, which make an exponential number of documents available, could weaken the market. Meanwhile, there is the matter of the validity, type and bias of disseminated information. The role of the teacher and the nature of their professional practice are also open to discussion. The information contained in these tools does not have the same function as those presented in printed textbooks. Similarly, teachers no longer seem to be mediators of truth. The use of digital resources brings into question the relationship between knowledge, teaching and what is taught.

This Regional Conference resulted in a publication with more than thirty papers written in the authors' native language but with an extensive summary in English for greater impact. This decision was taken by the conference organizing team for the broader dissemination of the research carried out in the Ibero-American context and which is little known among English-speaking researchers.

This volume also highlighted a highly relevant work in the field of textbooks consisting of a **bibliography on printed school textbooks and digital school textbooks** by the Columbian textbook editor William Mejía Botero. The author states that, "The sources contain more than 1200 references from more than 200 different periodicals (printed and digital magazines and newspapers), which shows the current and abundant interest in this type of educational materials. Furthermore, they appear in three languages: Spanish, English and Portuguese (especially Brazilian doctoral dissertations). The bibliography is divided into two parts: the first contains books, doctoral and master's dissertations, reports and articles from specialized journals. The second, basically comprises press material (...)".

Considering the disperse production of studies on textbooks and the resulting difficulty in this field of production, as pointed out by Alain Choppin, the revision by Mejía constituted an important contribution by the Pereira Regional Conference for research on printed and digital textbooks, and also for the aims of IARTEM.

The second Regional Conference was held in Buenos Aires, Argentina, in 2018, and it was also supported by NPPD/UFPR (Brazil). The conference was organized by the Universities of Lujan and Buenos Aires, in addition to researchers from other Argentinian institutions, requiring intense local coordination and yielding promising results in terms of new joint projects. About a hundred papers were presented, with an expanded Latin American participation (Uruguay, Paraguay, Mexico) and including European researchers from Spain and Portugal. As in the Colombia conference, the proceedings were published in 2019 in the author's preferred language with an abstract in English.

Thus, it can be said that IARTEM already presents interesting results in terms of opening up to Latin America. This trend should continue in the coming years as we expand the possibility of incorporating new members, joint projects, publications and strengthening the Association's objectives.

IARTEM AND ITS STRENGTHENED RESEARCH. COLLABORATIVE PROJECTS UNDER CONSTRUCTION

Let us take a look at the evolution of IARTEM as described by Egil B. Johnsen, Susanne Knudsen and Steffan Selander. Much has been built collaboratively with the participation of people and groups from different places and cultures. The following are a number of achievements that should be acknowledged and challenges that remain for discussion at future conferences:

a) Development of the IARTEM E-journal, which began publication in 2007 with Mike Horsley and Staffan Selander as editors, understood as "an international forum for research publications on textbooks and educational media". Coordinated by Prof. Mike Horsley until 2015, this challenge requires new forms of editorial organization in order to be a multicultural and multilingual vehicle for the dissemination of research and work on the subject.

b) Coordination of research projects involving groups from different countries, traditions and research cultures. In this sense, the experience of the music group created within the framework of IARTEM, with the organization of the congress in Santiago de Compostela (2019) mentioned above, represents a clear example of collaborative work to be pursued. At the conference held in Buenos Aires, there was a proposal for new groups in the field of educational resources to be able to develop their own initiatives. A collaboration was also announced between Inclusive Education and Natural Sciences groups.

c) Actions to promote the exchange of literature between the English-speaking and Latin American contexts to facilitate the exchange and flow of knowledge among our countries. Positive outcomes have been attained from collaborations on publications as well as those with extended abstracts in English. The organization of sessions in different languages at the Biannual Conferences has also been a stimulus to exchange and the expansion of participation in IARTEM.

d) There is a need to cross-check bibliographies among countries and conduct comparative studies, which still constitute a gap in the field of academic production on textbooks and educational media. Collaborative thematic projects could be an instrument for working toward this objective.

e) Expansion of theoretical sessions at conferences, with deeper discussion on the challenges of knowledge production regarding textbooks and educational media from the perspective of diverse research traditions. The increasing focus placed on specific disciplinary contents poses new questions for research, whether in terms of historical, sociological or linguistic approaches, or in terms of the epistemological and didactic specificities of teaching content (eg. mathematics, geography, and natural sciences).

f) Greater connection with other research networks for the purpose of intermittent collaborations, as well as longer-term actions and projects. In addition to the individual member participation in different spaces, the challenge is to strengthen institutional ties. There is a need to share research projects, publications and also training actions that stimulate the relationship between theory and practice.

Without going into all the future possibilities, and recognizing the challenges that face an association like IARTEM, which is nonprofit and supported by funding and work by its members, we would like to conclude by reaffirming the following: a) our confidence in the contributions already made to the field by the actions carried out and the path following over IARTEM's 25-year history; b) despite the inherent difficulties of this type of associations, the positive outcomes attained clearly justify our confidence in the potential of continuing to work collaboratively, respecting local specificities and building common spaces for dialogue.

This 25-year journey, which we know through memory and history, can also project into the future with new configurations.

PART 1

IARTEM, AN INTERNATIONAL ASSOCIATION

B. MEMBERS' WORDS

MEMBERS' WORDS

SUSAN RICHARDSON

Central Queensland University (Noosa, Australia)

Teaching pre-service teachers and Research (Homework)

I became involved with IARTEM through my colleague, mentor and friend, Professor Mike Horsley. Mike viewed IARTEM as being a "researcher family". He delighted in the opportunity to bring new researchers and educators into IARTEM so that they too could experience the collegiality and international diversity of those with whom he worked. Mike used to say that "researchers travel the world" and through my involvement with IARTEM, I have had the pleasure of attending and presenting at two IARTEM conferences; in Ostrava and in Lisbon. Both times I felt supported and embraced by the IARTEM community. There was genuine interest in the homework research that Mike had started with me; interest in the ways in which Australian primary classroom teachers develop resource materials to support homework tasks.

Most importantly though, attendance at IARTEM conferences generated connections with like-minded people, with people exploring interesting aspects of education and presenting their ideas in passionate and interesting ways. My fond memories of IARTEM events are of stories told, meals shared, loud laughter, warm smiles and engaged research.

Vale Mike Horsley. Thank you for inviting me to be part of the IARTEM family.

OMMUND CARSTEN VAREBERG

University of South-Eastern Norway

Secretary of IARTEM

Why did I join IARTEM? Some of the founders, early members and later presidents of IARTEM like Staffan Selander and Susanne Knudsen were educational media researchers connected to my institution – Vestfold University College in Norway. This institution do research in pedagogical texts a strategic field in the 1990s and established a master programme in 2005 and later a Ph.D. programme related to educational media research. Several of my colleagues like Ragnhild Lund, Dagrun Skjelbred and Bente Aamotsbakken have also served on the IARTEM board. At the conference in Tønsberg in 2007 I had the pleasure of getting to know Mike Horsley who put his trademark of strong dedication to educational media research, internationalism, warmth and hospitality on the organization. As a novice researcher I wish to contribute to a certain institutional continuity and to give younger researchers an opportunity to establish international networks. As a teacher educator I consider that quality in teaching and educational media is important for all pupils and students, not the least for giving the less privileged opportunities to develop their resources and participate in society and the labour market. Working for IARTEM and developing knowledge about educational media didactics and educational media analysis is a contribution in that direction.

I think one of the best things IARTEM does, is giving young researchers opportunities to connect with international researchers in an open and inclusive atmosphere with a great diversity of theoretical and methodological points of departure. IARTEM offers continuity through biannual international conferences, and the senior researchers act as door-openers to more specialized research groups and institutions that can offer collaboration opportunities.

NAHÚM MISAEL TÓRREZ

Lecturer in English, Universidad Nacional Autónoma de Nicaragua (UNAN-Managua)

Ph.D. candidate, University of South-Eastern Norway (Campus Vestfold)

IARTEM has opened up a world of possibilities for me as a young scholar. In 2016, I was given support to attend the Regional IARTEM Conference in Pereira, Colombia. In 2017, I was given a small grant to cover some expenses to travel to Lisbon, Portugal, to attend the 14th IARTEM Conference. In 2018, I was given the opportunity to publish the first article of a series of three articles, as part of my Ph.D. thesis on English language teaching textbooks from Nicaragua and Norway.

To put it in simple words, IARTEM has provided me with networking opportunities, travel support, publication channels and lots of friends. Here, I especially want to thank Dr. Jesús Rodríguez Rodríguez (Spain), Dr. Miguel Angel Gómez (Colombia), Dr. Tania Braga García (Brazil) and Dr. Edilson Aparecido Chavez (Brazil), for their friendship and encouragement.

Thank you very much!

CHAE-CHUN GIM

Professor, Department of Education, Yeungnam University South Korea.

Former Secretary of Education to the President of South Korea (2013-2014)

Former (58th) Vice-Minister of Education, South Korea (2015)

Former (17th) President of KEDI (Korean Educational Research Institute) (2016-2017)

Hello everyone!

My sincere congratulations on the 25th anniversary of IARTEM. It is like a homecoming for me, as I have not been able to attend the IARTEM meetings for the past five years, working in a few governmental positions in South Korea. Prior to that, I was able to develop my thoughts on textbooks and teaching materials by participating in IARTEM events as a member and board member. I miss IARTEM members who shared many experiences at the time.

As everyone acknowledges, textbooks and educational media are important elements in education. Especially in Asia, including Korea, the importance of textbooks or educational media is even more significant because classes are highly dependent on textbooks. With the development of ICT, the use and role of future forms of textbooks and educational media will become more important in school education in the future. In Korea, we seldom have opportunities deep discussion on textbooks and educational media. In this context, IARTEM is a meaningful community for researchers like me, who are deeply interested in textbooks and educational media.

Currently, I am starting a new chapter in my career, returning to my University as a professor since the spring semester of 2018. I plan to continue my research on textbooks and educational media. It will be a great help and happiness for me to get involved in IARTEM. I look forward to meeting my old colleagues and new members at the next meeting.

CRAIG RICHARDSON

Central Queensland University (Noosa, Australia)

Teaching pre-service teachers

I am honoured to have considered Professor Mike Horsley a friend. In truth, he was far more than that. Words like mentor, inspiration, role model do not do justice to the profound impact that Mike had on me. Mike taught me that what I had to offer was in fact worthwhile. He invited me to be part of his extended IAR-TEM family where I was welcomed warmly. My participation in IARTEM truly opened my eyes to the global possibilities that existed within this group. I found the overwhelming sense of collegiality and acceptance from this group quite life-changing in terms of my professional life and career pathways. Mike was fond of saying that "Researchers travelled the world". I found this to be true. Through my IARTEM involvement I was afforded the opportunity to present at two conferences; in Ostrava and Lisbon. I clearly remember the humbling but profound communications I had with a Portuguese Professor in Ostrava in English (my only language) and the fourth language of the Professor. To be able to reconnect years later in Lisbon was a true testament to the IARTEM community. These are warm lifetime memories that were made possible by Mike Horsley and the extended IAR-TEM family. My memories of IARTEM are fond indeed. Warm and sincere greetings, a sense of fellowship and genuine curiosity and interest in my story.

Vale Mike Horsley. Thank you for inviting me to be part of the IARTEM family.

Warmest regards

RAÚL EIRÍN NEMIÑA

Faculty of Education

Santiago de Compostela

The first time I attended a IARTEM conference was in Santiago de Compostela, 2009. It was an extraordinary opportunity for meeting people interested in education. Administrators, teachers, editors, researchers and academics were "under the same umbrella" talking and sharing ideas and points of view related to educational materials and the way they can help our schools and teachers do their job better.

For me, it was a place for sharing my thoughts and research, as well as an opportunity for meeting interesting people from different places and backgrounds. This allows me to contact, share and work with new colleagues in different countries and continents, open my mind and deepen my understandings of the area I am working in, teacher training and the value of educational materials as a "representation" of the underlying values, conceptions and practices.

I am grateful for being part of the conversation, rethinking my values and personal theories and keeping in touch with incredibly smart colleagues that make me eager to improve my thoughts, writing and practices, with the aim of becoming a better teacher. Hope to work in this line -with the support of IARTEM- for the next 25 years.

JAAN MIKK

Vice president of IARTEM in 1997 – 2002

Professor Emeritus of Tartu University, Estonia

IARTEM in my life

IARTEM has given me good contacts and knowledge about textbook research in Europe. Thanks to the contacts, I have twice studied for a month at Georg Eckert Institute and been exposed to new ideas, I have found work for four years and I am participating in the jury of Best European Learning Material Award. We have organised the IARTEM conference in Tartu University and published the third IARTEM volume.

I am happy that IARTEM leaders have done a very good job. The IARTEM journal is high ranking; IARTEM conferences are systematically organised and collections of papers published; IARTEM has a good website. These efforts are justified by the exceptional role of textbooks and educational media in the process of learning.

DR. ALAN PEACOCK

Honorary Research Fellow, University of Exeter, UK

The various meetings of IARTEM that I attended allowed me to meet fellow professionals in the field, to gain new perspectives on the interpretation of text and text use in different cultures, and most importantly, to engage in joint, cross-cultural research and publishing, in contexts as diverse as the Middle East, Canada, Southern Africa and Chile. It also linked to my work with UNESCO, and demonstrated how one organisation (IARTEM) could be efficient in its publications, whilst the other (UNESCO) could be so bound by bureaucracy that our three years' work on promoting international understanding through text material has sadly never been published. Though I am now fully retired and no longer involved in textbook research, I still keep close contact with several of the colleagues I met through IARTEM, and value these links immensely.

ANTHONY HAYNES

Creative Director, Frontinus Ltd (frontinus.org.uk)

I work in the UK, where there is relatively little research into textbooks. They also tend to be neglected by politicians, who find such things as iPads and interactive whiteboards much sexier. When I was working on my book, Writing successful textbooks (A&C Black), I started to look abroad and was heartened to find that elsewhere textbooks and textbook research were taken more seriously. My engagement, first with Jaan Mikk's Textbook (Peter Lang) and then with IARTEM, helped me to learn about thinking from other regions – especially central and eastern Europe and the Nordic and Baltic countries. I found IARTEM conferences both informative and convivial and I was particularly gratified to meet Professor Mikk, with whom I subsequently developed a short course on textbook authorship for the University of Tartu.

ARNO REINTS

Iartem board member

Textbooks have always been my passion. I have always thougtht that it would be easier to develop quality materials than to educate quality teachers. That's why I think that learnabllity aspects of textbooks are so important. The attention given to textbook research in the Netherlands has never been high. This has to do with the Freedom of (Religious) Education Act of 1917. Because of this Act the Government has a very modest role in monitoring the quality of education in general and textbooks in particular. Because of this and the free market, publishers in our country rule the quality of textbooks. Thus, thick packages of them are make and teachers are made dependent on textbooks and publishers. As a result of this there is hardly any research on the quality of textbooks because you are always dependent on the cooperation of publishers, who do not want you to interfere between them and consumers. That's why I felt at home within IARTEM, because here I could meet colleagues who actually did carry out research on textbooks.

Also the variety of researchers was/is very stimulating. IARTEM-researchers come from different backgrounds: linguistic, geographical, historical, symbiotics, etc... I felt it important from my background as an educational psychologist to give attention to the learnability of textbooks. In my opinion you cannot study textbooks in the same way as if they were commercial leaflets, novels, or movies. Learning is something different from gathering information or being entertained.

And last but not least: research results should be translated into practical consequences for textbook authors, publishers, teachers, teacher educators and so on. Theory and practice should be linked to each other. It is my wish that IARTEM continue developing more in this direction in the coming years.

GIOVANI JOSÉ DA SILVA

Universidade Federal do Amapá - Brazil

Conheci o IARTEM em 2012, por meio de um convite da Prof.ª Dr.ª Tânia Braga Garcia (UFPR), a fim de participar da Conferência Regional IARTEM Brasil 2012 ocorrida em Curitiba, Paraná, entre 29 e 31 de agosto. Ali, pude conhecer pesquisadores do mundo todo e apresentar algumas reflexões sobre as representações indígenas em materiais didáticos, especialmente de História, no Brasil. A partir da conferência produzi um texto para a publicação em livro (no prelo). Em 2016 um novo convite me levou à Pereira, Colômbia para a Conferência Regional América Latina, ocorrida entre 07 e 09 de setembro. Novamente pude apresentar um trabalho de síntese que venho realizando há algum tempo sobre como populações indígenas são apresentadas, no passado e no presente, ao público escolar. Para mim, participar das atividades do IARTEM significou um aprendizado significativo e, mais do que isso, compartilhar conhecimentos com pesquisadores sérios e comprometidos. O IARTEM contribui de forma relevante para a comunidade científica internacional e para o campo de estudos sobre materiais de aprendizagem e de ensino. Oxalá que a associação continue seu trabalho de congregar investigadores de distintas partes do mundo em torno das temáticas dos livros didáticos e das mídias educacionais.

I came into contact with IARTEM in 2012, through an invitation from Prof. Dr. Tânia Braga Garcia (UFPR) to participate in the Regional IARTEM Brasil 2012 Conference held in Curitiba, Paraná, from August 29 to 31. There, I met researchers from all over the world and presented some reflections on indigenous representations in didactic materials in Brazil, especially in History materials. From the conference, I produced a text for publication in a book (in press). In 2016 a new invitation took me to Pereira, Colombia for the Regional Latin America Conference, which took place between September 7 and 9. Again I presented a review that I have been working on for some time about how indigenous populations are presented in public schools, in the past and present. For me, participating in IARTEM activities has meant significant learning and, more than that, sharing knowledge with serious and committed researchers. IARTEM contributes significantly to the international scientific community and to the field of learning and teaching materials. May the association continue its work of bringing together researchers from different parts of the world around the themes of textbooks and educational media.

MICHELINE RAVELONANAHARY

Retired English teacher trainer

Teachers Resource Centre Antananarivo

Ministry of Education

Madagascar

I was introduced to IARTEM in 2005 and have participated in 3 conferences. IARTEM is an interesting and active association. Its activities have helped me to develop my professional knowledge and improve my teaching skills and practices through the exchange of ideas and experiences with many participants from different countries. The mini conference organised in my country , Madagascar, in 2008 has given my colleague teachers the opportunity to have direct contact with foreign experts and engage in discussions about how to improve learning and teaching materials. That was such a valuable experience for us. The book "Caught in the web or Lost in the textbook" in which my first publication appeared is displayed among our collections at the library and is always of great help to teachers. Thanks to IARTEM, I continue to have contact with people abroad who are interested in my publications to discuss and share ideas. Again, I would like to thank everyone who made my participation possible. My Congratulations and Best Wishes on the 25th Anniversary of IARTEM.

RAGNHILD ELISABETH LUND

University of South-Eastern Norway | USN

Faculty of Humanities, Sports and Educational Science

Department of Languages and Literature Studies

Campus Vestfold

Congratulations to IARTEM!

I wish to express my deepest gratitude to IARTEM for its work to strengthen research on textbooks and other educational media and to make such research more visible. Above all, I want to thank IARTEM for providing me with the opportunity to be part of a growing, global network of researchers. While my field of interest is ESL / EFL (English as a second / foreign language), IARTEM provides inspiring collaboration beyond my own particular focus.

My first encounter with IARTEM was in 2001, when I attended the conference in Estonia. Since then, I have presented papers at the conferences in Slovakia (2003), Norway (2007), Madagascar (2008), Spain (2009), the Czeck Republic (2013) and Germany (2015). I have published articles in conference volumes and in the eJournal, where I have also been a reviewer.

In 2008/09 I was IARTEM's secretary, with a main responsibility for the conference in Spain. Having experienced how much it takes to organize such an event, I also want to thank present and past IARTEM volunteers for all the work that you do, and the great companionship that you provide.

RICHARD WALKER

Sydney School of Education and Social Work

The University of Sydney

Sydney. NSW. Australia

IARTEM Reminiscence: Mike Horsley and Bratislava

I'd like to write about the IARTEM conference I attended with my best friend Mike Horsley. The conference was in Bratislava in 2003 and while Mike and I co-authored several IARTEM papers, this was the only conference I ever attended. Needless to say, our paper hadn't been written when we left Australia so Mike suggested that we go to Portugal to write it. Which we did. We stayed in a youth hostel, explored Lisbon by day and wrote the paper at night. The paper focussed on the notion of Textbook Pedagogy which Mike was writing a lot about at the time. Then we headed off to Bratislava and the conference. I'd been used to large European or American conferences so the IARTEM conference was a big change for me. The conference was a little like a family gathering since it was easy to meet people and many people knew each other well. I enjoyed the conference immensely. It was the last time that I attended a conference with Mike. As many of you know, Mike died in 2016. I spoke at his funeral. He was a wonderful friend and I miss him very much. He was also a great friend of IARTEM over a number of years. It is very fitting that Mike be remembered on the occasion of the 25th anniversary of IARTEM.

PART 2

MULTIPLE RESEARCH ACTIVITIES AND PRODUCTIONS

A. TEXTBOOKS AND EDUCATIONAL MEDIA ASSESSMENT

A REVISION OF PROPOLSALS FOR TEXTBOOK AND DIDACTIC MATERIAL MODELS AND EVALUATION GUIDES

JESÚS RODRÍGUEZ RODRÍGUEZ

In this chapter we analyze the principal models and guides used in the analysis of curricular materials. We make reference to a number of recent Iartem publications and pay special attention to series of guides that have been elaborated over the last 25 years which have been very useful for research projects as well as helping teachers in the materials selection processes. We also provide a classification and summary of the most relevant models and guides for researchers and teachers to use in the future.

CONTEXTUALIZATION

In general, the importance of these guides and models lies in that researchers, teachers, students, parents, and otheres can use them to carry out an analysis and selection of curricular materials in an organized, critical and reflective way. The fact is that in order for materials to be a valuable resource in educational practice teachers should be provided with models for evaluation and selection (Parcerisa, 1996; Parcerisa and Zabala, 1994). This set of models and guides make explicit or implicit reference to the proper attitude for teachers to address curricular materials, and make suggestions about evaluation, use, and the roles of different members of the educational community. To some extent, what the teacher is expected to do with curricular materials is explained and clarified for a given educational context.

Interest in evaluating materials and using models and guides grew as a result Educational Reform in different countries. Regarding the Spanish context, Parcerisa (1996: 69) points out the following:

> "At the present time, there are indicators, as a result of the implementation of the reform, of a certain rise in interest, which had been somewhat shutdown since the middle of the eighties, when a number of proposals appeared involving educational technology formulations, such as Rodríguez Diéguez and others (1984), who performed their analysis from a communicational perspective, pointing out the features that a book should contain to foster more effective communication."

In order to clearly understand the differences and approaches in models for materials evaluation, it should be noted that the reasons underlying the analysis and evaluation of these materials have not always been the same. The evolution of assessment models is in line with the evolution of curricular materials research. Initially, concerns were mainly of a technical nature, but later on analysis mod-

els began addressing aspects such as emotional and social questions. As we shall see later, each guide has its own peculiarities and characteristics. They emphasize different aspects of materials: formal aspects, how teachers should use materials in the context of the curriculum and decisions that need to be made by schools. Indeed, each of the guides represents a way of understanding the role of teachers, students, and schools with respect to curricular materials because they all reflect ways of understanding education.

In this chapter we attempt to distinguish between the concept of "model" and "guide", though the terms are sometimes used interchangeably in the analysis of certain proposals. When looking at the literature on the subject, the concept of "evaluation model" usually refers to broader more-developed proposals, which may then be evaluated and compared in practice and specified into guides for practical application. However, this is not always the case, since we often find "simple" guides that appear as evaluation models and models that only appear exemplified through "simple" assessment guides.

In order to better summarize and understand the aims of each model and guide, we have established a classification in terms of the dimensions they address. We also wish to reflect the diversity of approaches adopted in the analysis of materials. Most of the models and guides selected here were prepared by researchers or work groups to provide teachers with tools to help reflect on and critically analyze their practice. In addition, we opted for those models and guides from the pedagogical literature considered to be part of sophisticated research projects. Such is the case with Martinez Bonafé (1995) and Parcerisa (1996). Some models and guides were selected because they proposed analysis on specific topics such as cross-cutting themes or sexism.

The models and guides selected were classified as follows: General models for media analysis, Models and guides for the analysis of materials, Models and guides focusing on printed curricular materials, Models and guides for the analysis of textbooks, Material analysis proposals based on educational "stage" or subject "area", Models and guides for the evaluation of distance learning materials, Models and guides focusing on student self-production (with teacher orientation), Models for the evaluation of curricular projects, Models and assessment guides focusing on cross-cutting topics, Models and assessment guides focusing on materials for adults, Guides for the evaluation of visual material, Guides for the evaluation of activities and the role of materials in the development of these activities, Guides for evaluating digital materials, Materials published by Non-Governmental Organizations, and Other guides.

MODELS AND GUIDES

General models for media analysis

In *Análisis de medios de enseñanza* (The Analysis of Teaching Media), Cabero (1990) makes an exhaustive review of the different classifications and models that had been formulated on the topic of teaching media. In one section, the author mentions a series of general models. Standing out among these are the Clark's Taxonomic Cube (1975), the Di Vesta Model (1972), the three-dimensional Model of Media Selection by Cheek (1977), the taxonomic Iter by Luchi (1983), the Salomon Model (1981), the Heidt Model (1978), Interactive Model for Media Research, by Escudero (1983). Before going into evaluation-guide proposals in more detail, we would like to mention the very interesting review made by Cabero (1999: 89) regarding the perspective from which media evaluation should be carried out. This author reviews a substantial part of the evaluation models and guides published up to the 1990s. In summary, the author states that "the fundamental strategies for the evaluation of any type of teaching media or material are the following: self-evaluation by creators, consulting experts, and evaluation "by and from" users. Each one of these has potential and limitations, therefore, the evaluation of a material should not be limited to just one, especially in consideration of the fact that self-evaluation by creators is usually applied either consciously or unconsciously (p.105)

Also of particular interest is the review and interpretation of recent guides and evaluation models carried out by García-Valcárcel Muñoz-Repiso (2003). In relation to the evaluation of printed materials and textbooks (especially relevant for the 25th anniversary of IARTEM), the following evaluation perspectives are listed: objective consideration procedures, analysis of ideological contents, textbook readability analysis, analysis of the psychological processes involved in learning with textual materials, analysis of specific variable or components of text, integrating analysis of printed material as a resource for curricular mediation.

Models and guides for the analysis of materials

A representative and exhaustive sample of these models can be found in the bibliographical review by Woodward, Elliot and Nagel (1988) and in the PhD dissertation by Parcerisa (1995). As indicated in the introduction to this chapter, we decided to consider proposals that were elaborated based on sophisticated research:

Proposal by Zabalza, Proposal by Martínez Bonafé, Proposal by Parcerisa, Proposal by Zabala, Proposal by Rosales, Proposal by Gimeno*, Proposal by Del Carmen*, Proposal by Santos Guerra, Proposal by López Atrio et al, Proposal by Arias and Mora, Proposal by Huettems and Benson, Proposal by the Epie Institute, Proposal by Marjorie and Ernest Roe, Proposal by Krister,Proposal by Schug et al.

Proposal by Zabalza

This proposal basically addresses both external and internal media dimensions and emphasizes the assessment of media based on the teaching-learning process. Specifically, Zabalza (1989) highlights the following aspects of media analysis: consistency of didactic model, type of media and function; validity based on associated teaching-learning model; adaptability to school context; whether the media is learned or learning is done through the media; effectiveness.

Proposal by Martínez Bonafé

This is one of the most complete models on the international scene. Martínez Bonafé (1995) aimed to go beyond mere technical issues to encompass overarching concerns regarding the way curricular materials can determine much of school activity either explicitly or implicitly. The author proposes a model integrating the textual, curricular and cultural dimensions of materials. The advantages and characteristics of this model include the following:

— it helps to analyse materials beyond purely technical considerations and searches pedagogical potential.

— it helps to pose the question of didactic strategies that can be applied with the material.

— it assists the professional debate among the teaching team, whether it be the Seminar teaching staff, the Cycle teaching staff, or any other school team.

The proposed model has two parts. The first provides a form for characterizing the material, accompanied by a series of instructions for filling it in. The second is the outline-questionnaire itself.

By way of summary, the model presents the following dimensions to consider in the evaluation of materials:

— Pedagogical model implicit in the material, educational aims and curricular principles.

— Cultural content and form of presentation. Selection Code and rationale for sequencing and structuring. Content inclusions and exclusions criteria. Culture and values.

— Didactic strategies. Methodological instrumentation for cultural transmission

— Professional Model implicit in the material.

— The student learning model.

— Organic tasks involving the school.

— Material evaluation and its connection to teacher training programs

This guide is rife with sociological aspects of the curriculum, thus, its attention to content inclusion and exclusion policy, culture and values, and so on. There are also references to other fundamental issues such as teacher professionalization, degree of teacher autonomy, and the teaching role. The student learning model and school organizational tasks are also addressed.

Proposal by Parcerisa (1996)

The model proposed by this author was designed for the most widely-used curricular materials: paper-based materials for use by students and their related teacher materials, as long as they are aimed at helping teachers in the process of curriculum planning, development and/or evaluation.

The following analysis areas are proposed:

— educational aims.

— learning requirements.

— attention to student diversity.

— formal aspects.

The proposal identifies four areas that represent the major issues for analysis: what the material intends to teach, the extent to which it is consistent with meaningful and functional learning, how it addresses the determining factor of student diversity, and the material's formal characteristics.

It is safe to say that, along with Martinez Bonafé's proposal, this is one of the most extensive and complex guides developed in the Spanish context and probably internationally as well. Apart from the variety of issues, one of the most important aspects of this guide is that it was tested in a research project whose results presented a high level of reliability.

Proposal by Zabala

Other types of proposal focus on materials aimed at students, Zabala (1990) affirms that the following should be done to analyze this type of material:

— Review the underlying educational objectives and verify the extent to which they correspond to those established for the school and the targeted group of students.

— Review of contents.

— Determine the sequence of activities.

— Analyse each activity proposed in the materials for every section of content

— Verify that every proposed activity meets the requirements for significant learning in relation to contents

— Determine the degree of adaptation to the educational context

One of the most relevant aspects of this proposal by Zabala is the emphasis on delving into the types of content and activities in materials. Another feature is the focus on underlying aims. In this respect, the recommendation to identify the relation between the aims of a material and those stipulated by the school stands out.

Proposals of Rosales

An aspect of this proposal that should be highlighted is the suggestion to evaluate the capacity of a media to support curriculum development. Another point that stands out is the emphasis on determining how teachers and students can use the material harmoniously. Keep in mind that other proposals tend to focus either on their recipient (student) or on the teacher, but not on the relationship between them. Rosales (1996) mentions the following criteria to take into account in the assessment of didactic media:

— The capacity to facilitate/support the curriculum development and the accomplishment of teaching tasks.

— The capacity to foster student motivation and facilitate their learning tasks.

— Harmonizing and balancing both teachers' and students' expectations regarding its use.

— Involvement by institutions and people from the school's social and cultural environment.

Proposal by Gimeno

In this proposal, the author makes reference to the symbolic aspects of messages and what Gimeno calls extra-media aspects: costs and so on. The author places special emphasis on these factors as conditioning the power and representativeness of textbooks in the classroom. Gimeno (1981) highlights the following issues that should be taken into account in the analysis of materials:

— Pedagogical functions.

— Degree of message symbolization.

— Degree of recipient participation allowed by the media and real participation deriving from its effective use.

— Power of methodological definition: role of the media in the instruction process and the degree to which it is conditioning.

— Internal characteristics of the media: technical aspects.

— Extra-media aspects: costs, didactic benefits, complementary equipment needed, etc.

Proposal by Santos Guerra

Santos Guerra (1991) explains that the analysis of materials should contemplate three fundamental areas:

— Development and dissemination policy. Evaluation should address the concision level of materials, and the degree to which the material's guidelines or instructions are mandatory.

— Nature of materials. (For the analysis of this question the author follows the principles by Raths, 1971; which are presented further on).

— Use of materials.

The proposal does not specify the different aspects that should be taken into account, but rather mentions three fundamental reference frameworks. The author pays special attention to "how" classroom activities should be designed.

Proposed by Del Carmen

Anther type of material analysis proposals refers to collections of curricular materials; it is worth pointing out the one by Del Carmen (1993), which mentions the following aspects for analysis:

— General characterization (scope of the project, description of materials, general objectives, etc...).

— Appropriateness to the prescriptive curriculum (concurrence between general project aims/ contents and those of the prescriptive curriculum

— Adaptation to the criteria of the teacheing team (adaptation to the school's curricular project, agreement of the teaching team regarding general project aims and the orientation of the subject)

This guide mentions the need to consider the variety of existing materials which are or should be available to teachers.

Proposal by Lopez Atrio et al. (1994)

This guide is primarily designed for the evaluation of printed curricular materials, however, it can be used to evaluate other types of material. It should be noted that this proposal was employed in various teacher training activities, which helped improve and refine some of its points.

The proposal includes the following sections: - Format, Organization of contents, Selection of content, Type of content, Origin of information, Organizational tasks, Student learning model, Evaluation proposals, Degree of teachers' professional autonomy.

Proposal by Arias y Mora (1997)

The guide insists on the need for identifying the role assigned to the student and and to the teacher. Its principal novelty involves a section on the need for carrying out a follow-up analysis on the material's use. The proposal essentially focuses on the following issues:

— Factors related to form and appearance: usability, text format, illustrations, alternative and additional materials, facilitating aspects such as density of concepts, text-illustration relation, vocabulary used, challenge posed to students, capacity for play and amusement, creativity.

— Factors related to cost: the quality of the material.

— Didactic-formative factors: aims, contents, methodological aspects, evaluation, activities, role of students, complementary resources

— Cultural factors: current events, adaptation to the environment, reliability and validity of contents

Proposal by Doidge Huetteman and Benson

Huettems and Benson (1989) developed a tool for the quantitative and qualitative evaluation of materials. The tool contains 115 items for the evaluation of 11 aspects of the curriculum: philosophy, evaluation needs, topics, learning aims and standards, competence and sequence, field testing, instructional materials, teaching materials, learning assessment materials and cost. One of the most important aspects of this guide is its ability to integrate quantitative and qualitative aspects.

Epie institute

This guide was produced in 1973 by the EPIE Institute (Educational Products Information Exchange Institute) in New York. This agency disseminates informa-

tion on instructional material and equipment. This is an important "kit" that can be used to develop skills in the selection and evaluation of curricular materials. Designed to take two hours, participants examine 3 programs at the first stage of science and analyze the selection criteria Other components of the "Kit" include a set of tapes, a selection guide, a small book and some exercise items.

Marjorie and Ernest Roe

Among materials analysis projects, we should point out the work by Marjorie and Ernest Roe at the University of New Guinea, 1968-1972, which was completed in Australia by M. Roe, B. F. Carroll and G. Trevaskis. ACER (Australian Council for Educational Research) has published a number of curricular project evaluations and "Kits" following a descriptive method from the book, *Curriculum Materials Review Guide*. The curricular materials information is also included in the *Australian Education Index*, produced by ACER.

Proposal by Krister

Krister (1984) proposed a media selection guide for purchasing a resource or package of materials. The selection of media format is based on learning aims, and through a series of algorithms the guide provides guidelines for determining the best media according to general structure and level. The following are the main aspects for consideration: Utilization of visuals, use of audiovisual media, the need for real-life objects, specific examples or needs, need for models, individual or group work, the requirement for updating and reorganization, use of portable media, and budget.

The authors complement their proposal with a set of outlines to facilitate decision-making on materials and resources.

Proposal by Schug et al.

Schug et al.(1989) put together a guide that discusses the following aspects:

— Product characteristics: attractiveness, ease-of-use, aid to teacher management and justice considerations.

— Economic content.

— Middle School Student Focus: student curiosity, content related to student economic experience.

— Pedagogy: variety of instructional techniques provided, how clearly means of achieving aims are indicated, promotion of student learning development, and so on.

We should also point out the work by Bundsgaard and Illum Hansen (2010), *Holistic evaluations of learning materials*, which analyses the meaning of holistic evaluation in great detail and proposes different definitions as well as evaluation phases that can be followed.

Models and guides focusing on printed curricular materials

In this section we review models and guides that refer mainly to printed curricular materials. By delving deeper into the analysis of each of the models and guides, we were able to see the different analytical perspectives that have been considered in the study of these resources Likewise, we were able to better understand the role of textbooks within the broader set of printed curricular materials.

Among the guide proposals, we can point out the following as an example:

— Proposal by Area Moreira,

— Proposal by Velasco and Pérez *

— Proposal by Sarramona and Úcar *

— Proposal of Heredia[1]

— Proposal by Garcia, Prieto and Santos *

— Proposal by the Maryland State Dept. of Education, Baltimore

— Proposal by Crewe

Proposal by Area Moreira

Area Moreira (1994) proposes different partial perspectives for the analysis of printed curricular materials:

— Scales and objective procedures to facilitate the practical selection of material type from the vast set of options available.

— Analysis of ideological contents (eg. gender roles, racism, human rights, cultural and political concepts, etc...).

— Legibility analysis.

— Analysis of the psychological processes involved in learning with textual materials(from a cognitive psychology perspective).

— Analysis of certain variables or components of the text (eg, illustrations, questions, sequence, content organization, structuring of the information in the text).

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[1] Content taken from Parcerisa 1995

— Integrated analysis of the printed material as a mediating curricular re-
source (relevance or appropriateness to the curricular and teaching project).

We find that this proposal integrates different perspectives regarding curricu-
lar materials into sections. We would like to point out the reference to the need
for evaluating printed material as a curriculum mediation resource. This leads to
investigating the way in which the material serves to "codify" the curriculum itself
and its role within it. Likewise, we should underline this guide's analysis from
a cognitive psychology perspective of the psychological processes involved in
learning with materials.

Proposal by Velasco and Pérez (1977)

These authors point out the following aspects for consideration in a model of
material analysis: scientific criteria, didactic criteria, learning process, individual-
ization techniques, creativity education, socialization techniques, motivation tech-
niques, assessment techniques, and external aspects of the text.

As for the characteristics that a school textbook should bring together and
that can serve as a reference when trying to analyze it, these authors indicate that it
should be constructive, enjoyable, interesting, useful, include experiences, active,
didactic, intuitive, adapted, "challenging", globalized, logical, useful as a work
tool, creative, scientific, open, motivating, attractive, understandable, and fun.

Below we provide a list of other guides that generally include previously
mentioned aspects of curricular materials and what they most emphasize.

Proposal by Sarramona and Úcar (1992)

These authors mention the following aspects to take into account:

— Middle School Student Focus: student curiosity, content related to stu-
dent economic experience.

— Contents: selection and level of information.

— Language: language used, level of personalization.

— Pedagogical structure: structure of information, synthesis, examples, applica-
tions, assessment techniques, motivational elements and interaction techniques.

— Appearance (aesthetics, durability) and cost.

Proposal by Heredia (1980)

This proposal focuses on self-instruction textbooks. It mentions the following
to determine whether didactic sequences meet quality requirements:

— Clear aims.

— Information free of technical errors.

— Information organized in such a way that the context of each unit is clear.

— Meaningful and well-selected examples.

— Visual representations of the material presented through synoptic tables and flow diagrams.

— Varied questions and problems, whose function is not literally contained within the information provided.

— Revisions and self-exams at appropriate intervals which allow readers the ability to check their answers.

— Updated bibliography and reading guides for further information on the topic.

Proposal by García, Prieto and Santos (1993)

There are a number of guides focusing on the analysis and study of materials printed in foreign languages. We find this to be one of the most significant and it is aimed at the analysis and study of textbooks written in French. It addresses the following aspects;

— General considerations.

— Communication objectives.

— Coherence of aims and needs, interests and the student's level of linguistic competence.

— Didactic support with the textbook as a foundation, support materials include visual aids, recordings, authentic written documents, didactic guide, and activity books.

— Content:

— Organization,

— Content analysis

— Progression.

— Activities.

— Motivation or development of receptive and productive skills.

— Whether it fosters know-how.

— Whether based on students' experiences.

— Assessment.

— Adaptation of tests to the target audience.

— Adaptation of tests to established aims.

Proposal by the Maryland State Dept. of Education, Baltimore (Various authors, 1992)

This guide refers to the degree of skills and abilities that students present in the use and handling of library printed curricular materials. Among the activities that are proposed to check these aspects, the following stand out:

— Demonstration of the ability to locate and use materials and equipment

— Demonstration of the ability to review, evaluate and select media.

— Demonstration of the ability to learn and apply studies.

— Demonstration of the ability to understand content and various types of media.

— Demonstration of the ability to create printed and non-printed materials.

Proposal by Crewe (1981)

In 1976 the American Library Association adopted the following criteria:

— Widely relevant.

— Artistically representative, historical, and literary quality.

— Reflective of problems, aspirations, attitudes and ideals of the society.

— Contribution to the aims of the instructional program.

— Appropriateness for user level.

— Representative of different points of view regarding controversial matters.

— Fostering creativity.

The authors also mention technical aspects and explain that the materials should do the following:

— Have acceptable technical quality, clear narration, as well as synchronized illustrations and sound.

— Be legible, typographically coherent, and harmonious.

We should also highlight the existence of specific guides for specific levels of education. In this sense, we can point out the guide by Trueba Marcano (1997), focusing on the analysis of Didactic Models and Curricular Materials for Early Childhood Education, and which offers an extensive proposal to help teaching staff prepare an analysis guide. It ends with an example of a curricular materials guide built upon interactive principles.

2.3.1. Specific models and guides for the analysis of textbooks

In order to better understand the characteristics of the different proposals about textbooks, we point out the following issues mentioned by Blanco (1994), who indicates a series ofmethodological trends in the analysis of textbooks and school materials:

— The first tendency centers on a quantitative approach concerning the percentage of pages devoted to the topic under study; the association of certain adjectives to certain ethnic, linguistic, or other groups.

The development of these techniques aimed to provide greater scientific rigor to the analysis of textbooks, by assigning numeric values to words or expressions to minimize subjectivity and thus enable a better comparative analysis.

— The second methodological trend in the analysis of textbooks is what the author calls an "overall ideology". Its goal is to uncover the existence of a single or dominant discourse within a set of references taken from textbooks.

— The third theoretical-methodological proposal for the analysis of textbooks is what the author calls the intersubjective approach. This perspective is based on the critique made to the notion of objectivity when applied to history.

— Somewhere between overall ideology and intersubjectivity, the fourth proposes to demonstrate the globalizing and ethnocentric character of the racialist discourse that is present in textbooks.

From among the existing proposals, we have selected those which we believe best address the aspects that textbooks should bring together in response to the Education Reform and which make a critical analysis both from quantitative and qualitative perspectives: Proposal by Lacasa; Proposal by Canals i Roig; Proposal by Blanco; Proposal by García Alonso, Prieto and Santos Maldonado; Proposal by Richadeau; Proposal by Rodríguez *; Proposal by Bernad; Proposal by Pardo; Proposal by Gómez Campillejo; Proposal by Navarro *; Proposal by Blázquez; Proposal by Herrick and Gold.

Proposal by Lacasa

Lacasa (1994) presents a model which formulates a series of questions for analysing textbooks:

— What were the criteria by which the authors of the textbook "selected" and "reconstructed" the disciplines to be taught? - How do they adapt to the learner? - What are the common and different aspects among the various textbooks for the same subject? - What criteria were used to determine the sequencing of contents throughout the different stages of the curriculum? - Why do teachers choose some textbooks over others? - Is it preferable for students to use only one textbook or to choose among several?

This guide presents two main concerns. On the one hand, the use of materials by the teacher, and on the other hand, the use by students.

Proposal by Canals and Roig

Canals and Roig (1992) indicate that the following questions must be given priority when analysing textbooks:

— Level of rigour and up-to-date information provided.

— Didactic and logical sequencing in the presentation of contents and use of language.

— Maximum adaptation to target students' mental and psychological characteristics as well their vocabulary.

— Proper treatment of democratic social values insofar as sexism, racism, individualism, immobilism, conservatism, and so on.

— Formulation of activities that expose students to new fields of connection and practice.

— Presentation of issues that arouse children's interest in learning what is said in the book on that topic.

— Adequate illustrations to support the contents to be transmitted

— Suitably refined design, font and appearance in general.

Although this proposal refers to textbooks, its suggestions and considerations are applicable to any other printed curricular material. This guide emphasizes the need to delve into fundamental aspects of the Education Reform such as the following: treatment of values in a democratic society, adaptation to students' psychological characteristics, and so on. It also points out the need to inquire about formal aspects of materials such as type of activities proposed and their sequencing.

Proposed by Blanco

Blanco (1994) mentions the following aspects to evaluate when referring to textbooks;

General aspects

— Identification of the textbook's aims, suggestions on its use, and the cultural offering that it proposes

— Content selection criteria, underlying conception of knowledge, conception of teaching

— Concept of learning

— Hidden curriculum

Thematic structure

In most textbooks we can find various types of content in the structure of each unit whose appearance may differ.

Although each of these types of content must be analyzed independently, the author indicates some points that can be used as guidelines for the common analysis of material: Knowledge provided and/or required, values/attitudes referred to, presence of inquiry procedures, convergence/divergence, self-sufficiency, the requirement of individual or group activities, contextualization insofar as the presence of ideas, concepts, and problems that are relevant to the students, their surroundings, their interests and abilities.

Proposal by García Alonso, Prieto and Santos (1993)

These authors propose the following evaluation criteria for the selection of a textbook: general considerations, didactic support, contents, activities and evaluation.

We should point out the emphasis made by this guide of the type and characteristics of textbook activities. The analysis is done through a variety of dimensions such as the extent of student experiences.

Proposal by Richaudeau (1981)

Though published long ago, this proposal can be considered one of the most complete and widely used. This materials evaluation proposal originated from the need to evaluate printed materials (mainly textbooks) that were produced and disseminated in Latin American. We should point out that in some of these countries it continues to be an extensively used guide.

The author indicates a series of aims which the analysis of a textbook should address:

— Examination prior to use

— Selection of a textbook among various options

— Making recommendations to the authorities regarding the choice of text-book

— Writing

— Teacher training

The evaluation proposal produced by Richadeau contemplates three different indicators for each of the aspects analyzed: quick indicators (without interpretation of data), quantitative indicators and qualitative indicators. Among the major aspects that are proposed for detailed investigation, the following stand out: content, methodology, and the textbook as a physical object.

This guide systematizes the analysis of an interesting number of textbook dimensions and issues. However, it should be pointed out that at the time of its publication there was still no reference to the curricular dimension nor was there a need to evaluate a whole series of aspects and values that are currently manifest as a result of social and educational globalization processes.

Proposal by Rodríguez Diéguez (1993)

It proposes analysing textbooks based on:

— Content.

— The representation of the content through a series of components.

— Readability.

— The use of different structures.

— The expression or emphasis given by the authors.

— The iconic message, which could be included in the previous item, but is sufficiently relevant on its own.

Proposal by Bernad (1974)

This proposal includes a number of premises that should be taken into account when assessing school textbooks:

— The General Concept of Education: goals that are pursued, underlying philosophy, content to be conveyed, aptitudes for students to acquire, and so on.

— Adaptation of the textbook to students: this analysis is based on the developmental psychology studies by Piaget, based on Piaget's stages and adapting contents to them.

— Programming foundations. The degree to which the intended path of the textbook is indicated to both students and teachers.

— Legal regulations regarding textbooks. Check to see that the textbook complies with the standards dictated by LEG, 1970, which although scanty and vague, does express social expectations and minimum educational requirements.

One of the aspects covered in this guide which stands out and seems important considering the diversity of legislation on printed curricular materials is the focus on the evaluation of the "relation" of pertinent legal regulations to the content and structure of a textbook.

Proposal by Pardo

Pardo (1994) presents a simple guide which puts forth a series of criteria to consider when choosing textbooks:

— Language: use of terms, transmitted image of people, etc.

— Illustrations: balance between the number of images, and gender roles portrayed

— Contents: form in which names appear, type of jobs corresponding to each gender, etc.

Proposal by Gómez Campillejo (1993)

This guide proposes a series of guidelines that should be understood as an orientation

for any teaching professional to be able to make an assessment and selection of a textbook based on the teaching/learning experiences in their classroom, and use it in a suitable way so as to adapt to the needs and characteristics of their class.

The following aspects are highlighted in the guide:

— Textbook characteristics: format, interrelation of contents, sequencing, relevance to students' experience and environment.

— Strategies used in the organization of contents.

— Exposure and treatment of contents.

— Analysis of activities.

Proposal by Navarro (1985)

This author proposes the following aspects that an "ideal" textbook should include:

— Formulation of aims. Operational guidelines.

— Rationalised organization of scientific contents. Operational guidelines.

— Semantic level.

— Relational level.

— Organizational level.

— Expressional level.

— Activity Requirements. Operational guidelines.

— Availability of support material.

— Attention to individual differences. Operational guidelines.

Proposal by Blázquez (1994)

This proposal emphasizes that when it comes to determining a textbook assessment tool, it should be defined in terms of operational norms that check for the presence and extent of certain aspects. In this sense, the following aspects are indicated for evaluation:

previous organisers, language style, information density, use of complementary material, illustrations, questions, feed-back, summaries and other factors.

Proposal of Herrick and Gold

Herrick and Gold (1994) designed 5 instruments to explore the selection of textbooks:

— Student questionnaire.

— Instructor questionnaire

— Questionnaire asking instructors what textbooks should be like.

— Expert tool.

— Tool for collecting information regarding aims for statistics textbooks.

Of special interest for its exhaustiveness in the revision of existing proposals and the formulation of a new proposal for use by teachers is the proposal by Prendes Espinosa (2001), which can be consulted at https://recyt.fecyt.es/index.php/pixel/article/view/61168/37182.

Also of great interest are the proposals and reflections made on the evaluation of textbooks by Tholey and Rijlaarsdam, (2002), who offer an example of a heuristic model for textbook evaluation and Sikorova (2002), who provides an example of the evaluation processes followed in textbook analysis.

Finally, because of its comprehensiveness and practical strategies, it is important to highlight the book *Libros Escolares. Una introducción a su análisis y evaluación* (School Books. An introduction to their analysis and evaluation) written by Prof. Graciela Carbone (2003) and published by the Economic Culture Fund of Argentina.

Material analysis proposals based on the education "stage" or subject "area"

We consider it important to include some of the main guides focusing on this perspective.

— Proposal by Rosales

— Propoasl by Cantarero

— Proposal by Reynolds

— Proposal by Borthwick

Proposal by Rosales (1984)

Rosales mentions a set of general criteria and target aspects around which the evaluation of the materials should revolve. This proposal pays special attention to issues regarding adaptation to evolutionary stage, scientific content and learning characteristics.

Proposal by Cantarero

Cantarero (1993) proposes a series of analysis criteria grouped together in the following way:

— Curriculum organization: degree of specialization, stratification of the curriculum, methodological model, intellectual skills, classroom and school organizational model, conception of student role.

— Cultural selection: Cultural origins of contents, values, attitudes and ideology transmitted by materials; reproductive versus innovative nature.

Proposal by Reynolds

Reynolds (1993) developed a proposal for the evaluation and selection of materials for the study of English as a second language.

It makes the following recommendations:

— The textbook should contain interesting readings to stimulate opinions and constitute a good writing model.

— The textbook should encourage students to see greater importance in the subject.

— The textbook should provide models.

— The textbook should provide examples of grammatical structures.

— The textbook should help students understand that writing a second language implies a joint process of writing and grammar development.

— The text should help students of English as a second language learn to define the target audience by means of a short composition.

— A second language should help students deal with skills issues.

We observe that this guide is basically designed to analyze textbook structure and content and the way textbooks project messages. This guide presents clear connotations regarding grammatical issues, types of writing, etc. The guide does not refer to other aspects such as the role that the textbook plays with respect to other materials, and the model for the teacher who is considering the material.

Although the next guide also refers to the English language, it presents a totally different approach to selecting curricular materials, which is based on aspects such as cost.

Proposal by Borthwick (1982)

Among others, it identifies the following criteria for the selection of books in English:

— Price: How much does it cost? How much can we spend?

— Availability.

— Paper quality, printing, and book covers: whether the paper is durable, the printing clear and easy-to-read, and the material attractive.

— Acceptability: whether in general the book is acceptable to English teachers, coordinators, administrators, and parents as well as national and community groups.

— Utility: whether all students are able to read the book.

Models and guides for the evaluation of distance learning materials

Another set of proposals focus on the evaluation of printed materials for the specific sphere of distance education. We selected those by Benavente et al. (1994) and Bolaños-Mora et al.(1992) because they cover a considerable number of aspects and provide an overall view of the characteristics these materials should have. According to Parcerisa (1995: 366, citing Benavente et al.) the proposals by these authors present a set of indicators with the following characteristics:

"In a certain way, the indicators (....) constitute a system, since they are grouped according to the logical order in which they should basically be considered when evaluating a printed material. Two analysis areas are considered: structure and curriculum. Within each area they present sections which, in turn, contain a variety of factors. "

It should be noted that these guides pay special attention to formal aspects such as diagramming, format, and so on. They also focus much of their attention on the lexicon used in the textbook, as well as its communication structure.

Models and guides focusing on student self-production (with orientation by teacher)

Proposal by Jolibert et al. (1995)

Although the proposal by this team does not explicitly constitute a guide on how to consider curricular materials from the student perspective, we do think conclusions can be drawn from the dynamic that is formulated.

By way of summary, the authors consider that the following aspects of materials should be taken into account preceding and during the production of materials by students.

A child should be able to	
Before production	**During production**
— Accurately identify the situation parameters of the written communication: Who is the precise recipient of my writing? What is the purpose? What is the challenge to be written? What is the exact content? — Have a prior representation of the final product that one wants to produce: what kind of text to choose from the range of possibilities? What will be its general appearance? What materials should be chosen?	The authors identify the following criteria when defining a competent text producer: — Delineate the main linguistic levels of textualization: superstructure, textual linguistics, orational linguistics. — For each of these levels, mobilize their knowledge and competencies and try to develop new ones if necessary. — Manage the constant adjustment among the different levels during re-reading and rewriting — Pragmatic aims that go beyond text production: learning to work. — Socio-economic knowledge of writing.

Aspects for consideration when students produce own materials
(Jolibert et al., 1995)

It could be said that this is not only a model and a "new" style of evaluation guide on the self-production of materials from the student perspective, but also an interesting approach to understanding the production of printed curricular material. As we have seen, one of the axes which the guide revolves around is the need to investigate the reality experienced by students. The authors part from the assumption that the best way to produce truly significant materials and documents is for students themselves to become producers of text. This proposal is basically targeted at schools located in areas that lack materials and where it is very difficult for students to buy publishers-produced materials because they are not priced affordably enough for certain social groups.

Although parts of the proposal are directed toward the teaching staff, it basically aims to be a guide for students to self-manage the process of elaborating texts.

Models for the evaluation of curricular projects

The development of curricular projects is an opportunity to specify work proposals based on research-action involving new curricular materials. Some authors have formulated specific proposals either for evaluating the role of curricular materials within the overall curricular project, or for analyzing some specific aspect of printed curricular materials within these projects. By way of example, we have selected the following: Souto González (1996), Grupo Itaca (1996), Grupo Cronos and Asklepios (1995) and the Proposal by Souto González (1996).

These evaluation proposals demonstrate the need for evaluating material not only as a unique resource in the didactic process, but also as a unifying backbone for the whole curricular project.

Models and assessment guides focusing on cross-cutting topics

Below we include a series of guides aimed at analysing a specific issue within the school curriculum. We point out some of those that focus exclusively on cross-cutting topics and which we consider to be the most significant.

Guides on sexism

Issues regarding sexism have been the focus of several evaluation guides. Some of these guides stem from institutions that are concerned about issues, such as trade unions, and the Ministry of Social Affairs.

Proposal by Santiago Centeno et al. (1992)

This guide provide interesting contributions regarding the evaluation of sexism in school textbooks.

Among its most remarkable aspects is the fact of bringing together both quantitative and qualitative evaluation perspectives. Moreover, the guide is also characterized by presenting solution blocks for different characteristics. One of this guide's typical features is that it presents alternatives based on the results obtained from applying guides or models of use. In this sense, another set of guides should be mentioned that were prepared to address these issues such as those by the Ministry of Labor and Social Affairs (1996), Various authors (1996).

The evaluation guide developed by Zapico Barbeito (2012) deserves special mention and one of its main purposes is to present an exhaustive view of how aging is addressed. The instrument derived from the author's doctoral thesis, whose main aim was to discover the conceptualization, treatment and presence of aging in the Galician school curriculum, and specifically in a sample of curricular materials used in the sixth grade of Primary Education

In the field of educational inclusion, a number of guides and evaluation resources have been elaborated in recent years focusing on issues involving attention to diversity and educational inclusion. By way of example, the guide proposed by Delgado de Paiva (2008) focused on developing a guide-tool for the analysis of didactic materials and for detecting strategies in textbooks and didactic materials for addressing learning difficulties.

In the field of Environmental Education, guides have been produced for the purpose of analyzing topics such as the anti-ecological curriculum hidden within textbooks (See, for example, Ecologist in Action, 2007).

In the field of Music Education, some guides have been developed in recent years to analyze different aspects of Music Education materials. As an example, the guide designed by Cores (2017), which will be published shortly, provides an analysis document for determining whether printed and digital materials contribute to the normalization of the Galician language and culture. Likewise, Casal de la Fuente (2017) offers a proposal for assessing music books for children in Galician that includes a self-evaluation protocol and establishes the foundations of what could become a hypothetical evaluation committee on music books for children in Galician.

In fields related to mathematics and physics, it is also worth highlighting the existence of guides for analyzing materials from different perspectives and dimensions. (See, for example, the guide proposed by Bruch Trebien and Dias García (2013, 2015), regarding the analysis of Didactic Manuals for Physical Education.

Similarly remarkable is the proposal by Batista da Silva, V. and Perioli Júnior, E. (2016) about the promotion of Portuguese-language texts in Brazilian high school.

Models and evaluation guides focusing on materials for adults

Proposal by Lilley and Perkins and Virginia Model proposal

There are a number of guides that are aimed at analyzing educational material intended for adults. Among them, those by Lilley and Perkins and the "Virginia Model" commented by Nunes (1991) stand out for their complex elaboration process and for stemming from a collaborative project involving university students. By way of summary, the main aspects of these guides are as follows.

— Readability and stimulating activities — Students' reaction — Feedback regarding students' answers — Individual differences — Extensive selection at each level — Interest of the skills — Logical progression of skills teaching — Easy-to-follow instructions — Integration of basic skills — Large font with illustrations for comfortable reading — Limitation of the budget — Interaction between teachers and students — Recommended course level Unlike others, this model allows teachers and students to participate in the process.	*Criteria for educators* — Course content — Presentation of skills and vocabulary — Prescriptive diagnostic procedure used — Rhythm of skills and concepts — Effectiveness of exercises — Appropriateness of appearance for age and abilities — Proper instructions and examples — Appropriateness of feedback — Positive reinforcement provided — Maintains students' interest — Help provided for wrong answers — Quality of color and graphics — Usefulness of teacher's guide — Quality of the management system — Student assessment *Criteria for the student* — Easy-to-follow instructions — Degree of help available after incorrect answers — Evaluation of program effectiveness — Amusement of using the program.

Proposed analysis of materials by Lilley and Perkins and "Virginia Model" proposal.

Guides for the evaluation of visual material

Lantz (1994) developed a guide to evaluate photographic illustrations in instructional materials. The elaborated tool is made up of a battery of methods adapted from the fields of Linguistics, Reading and Cognitive Psychology. The guide evaluates the degree of visual information processed by viewers, both in the initial phase and during the process. What stands out in this guide is the involvement of psychology and linguistics in order to evaluate illustrations, photographs, and so on.

Guides for the evaluation of activities and the role of materials in these activities

Raths (1971) presents a guide for the assessment of activities in curriculum development. The didactic potential of materials is said to center on the following:

— Allowing students to make reasonable decisions on how to use materials and to understand the consequences of their choice.

— Allowing students to play an active role: researching, presenting, observing, interviewing, participating in simulations, an so on.

— Allowing or encouraging students to engage in the investigation of ideas, in the applications of intellectual processes or in personal and social problems.

— Putting students in connection with reality: touching, manipulating, applying, examining, gathering objects and materials.

— Enabling use by students at varying levels of ability and with different interests by providing tasks such as imagining, comparing, classifying or summarizing.

— Stimulating students to examine ideas or apply intellectual processes in new situations, contexts and subjects.

— Requiring students to examine topics which citizens do not normally stop to consider or may be ignored by the mass media such as sex, religion, war, and peace.

— Forcing the acceptance of a certain risk, failure and criticism, which may mean veering away from socially approved pathways.

— Obliging students to apply and understand significant rules, norms or disciplines, as well as analysing style and syntax

— Giving students the opportunity to plan with others and participate in their development and outcomes.

— Addressing students' interests so that they become personally committed.

Guides for evaluating digital materials.

There are currently a significant number of assessment guides available specifically designed for the proper selection of digital materials. Among them, we can point out the one by Reints (2002) and Reints and Wilkens (2010, 2014), the one developed in the Escuela Digital project (directed by Professor Manuel Area) for the purpose of analyzing a sample of Spanish teaching materials (Cepeda, Gallardo and Rodríguez, 2017) and the one by Rodríguez Reguera,. (s.f.).

Similarly, it is worth noting the existence of guides intended for conducting the evaluation of video games from various perspectives. The recent research by López (2018) presents a broad and well-founded evaluation guide for video games including an extensive review of different models and assessment guides from the field.

It is also worth highlighting the software evaluation proposals proposed by Cabero y Duarte (1999), Marqués (2002), among others. The study by Castro Ro-

driguez et al., (2007) presents an exhaustive review of educational software evaluation models and guides published primarily in the Spanish context up to 2007.

Materials published by Non-Governmental Organizations.

This is a relatively new and much-needed field of materials analysis. In this sense, the Esplugues proposal (2015) clearly stands out. Stemming from a doctoral thesis on the analysis of the education curriculum for the development of didactic materials published by NGOs, it includes an interesting tool for analysing resources developed by these institutions.

Other guides

We will now very briefly discuss another set of guides that were difficult to classify into any of the previous sections, but we decided to mention them here to understand the reasons that spurred their appearance as well as the variety of aims underlying them. Beattie (1966) presents a program based on a series of criteria to determine if a material is achievable, responds precisely to its aims, and allows for a thorough study of the subject in question. This guide was validated by application in three different programs.

Cowles (1976) presents two pages used to identify the degree and way in which programs provide a number of considerations to evaluate textual materials such as presentation sequence, clarity, and feedback. Eash, Talmage and Walberg (1975) examine the assessment of instructional materials from three points of view. Firstly, from an analytical perspective regarding quality and focusing on the pedagogical design of materials as well as their adequacy for the school program. Secondly, the guide presents a "reference file of pedagogical design constructs" in materials that are available on the market. Lang (1985) describes and compares the different systems of materials selection used by the State of Virginia and the Arlington Schools Division. This resulted in a series of "pilot" tests with materials. The research formulates different models for evaluating tools.

Leonard and Lowery (1976) describe the use of a tool to categorize questions in biology textbooks based on frequency, cognitive level, and type of scientific process required to complete questions. Muther (1984) recommended making a "skills trace" applicable to textbooks of the same series or even several series as a means of becoming familiar with the introduction, practice and evaluation of skills. Finally, we should mention a number of studies aimed at determining the applicability of these resources. Some of these projects represent research processes that yielded new evaluation guides. Among these we highlight the following that were discussed by Woodward, Elliot, Nagel (1988): Anderson and Armbruster (1983), Klare (1974-1975), Rowls and Hess (1984).

In the international context and within the framework of IARTEM, special mention should be made of the research on school textbook evaluation carried out by Jaan Mikk (2000); in particular his book *Textbook: Research and Writing*. In addition to offering very interesting proposals on how to write textbooks, this extensive work presents a broad and tested proposal for the evaluation of textbooks in various areas. Another good example of his reflections can be seen in Mikk, 2002.

As a summary

The need to evaluate curricular materials has spurred the elaboration of a variety of models and evaluation guides seeking to respond to different views regarding materials. By carrying out a review of these aspects, we were able to see a broad diversity of approaches; some models and guides were more open and general, allowing for an overall assessment and evaluating the function of curricular materials from a globalizing perspective contextualized in the curriculum, while other proposals were based on more quantitative criteria evaluating issues related to readability, understanding, format, and so on.

The proposals elaborated in the 1990s attempted to integrate the principles of what was expected from curricular materials in the Education Reform (Area, 1994; Cantarero, 1993, Parcerisa, 1996; Pardo, 1994; Zabala, 1990). These proposals introduced criteria referring to sexism, transversality, the connection of schools to their surroundings, adaptation to students' level and capacity, the relation of materials to educational and curricular projects, and the need to evaluate the degree to which new conceptual, procedural and attitudinal content appears in materials elaborated since the Reform.

In general, many authors point out that there is no strict need to carry out a complete application of their guide; but instead, based on reflection and needs, those aspects of materials should be selected that are most important or most appropriate at a given moment.

If we take, for example, the Spanish context and compare the guides that existed before the Education Reform of the LOGSE with those that were published afterward, we can clearly see an evolution in the process of curricular materials evaluation. It is an evolution from quantitative to qualitative considerations; thus, the early guides focused basically on formal questions, readability, reading speed, and so on; while later guides address issues such as content type, attention to diversity and plurality. Furthermore, it is done from various perspectives such as the publisher, the school, the teacher, and parents.

It should be noted that the most recent guides tend to emphasize the role and participation of teachers in the decision-making process regarding curricular materials. Thus, some guides focus on identifying the teacher model that is implicit in

the way curricular materials are used, while others refer to such things as the need to evaluate teacher participation in the elaboration and use of materials.

Likewise, the review of the main guides for materials analysis makes it clear that the study of curricular materials can not be carried out in isolation, separate from things such as social and political variables. Also, this review guide represents a great opportunity to consider the main issues that should be taken into account when evaluating materials developed in the context of the Education Reform.

From the standpoint of work at schools, we consider that the use of evaluation guides is an important indication of the professionalism with which teachers confront decisions on curricular materials. We have observed that many of these guides make suggestions not only regarding the formal nature of materials, but also on teacher organization, how to carry out collaborative work with materials, and how materials can contribute to the development of teachers' professional autonomy. All of these aspects demonstrate a professional attitude. Given that all these aspects are set out in models and guides, we consider that their use is an indication of the professionalism with which teachers address these decisions.

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HOW TEACHERS SELECT TEXTBOOKS AND EDUCATIONAL MEDIA

ARNO J.C. REINTS & HENDRIANNE J. WILKENS

In countries where teachers may choose their own textbooks they traditionally select a new series once every 5 to 10 years. Since the introduction of educational media into the classroom, the frequency of selecting textbooks and especially educational media have gradually changed. Digital learning environments offer teachers the possibility of bringing in their own content and this means that teachers nowadays have to decide sometimes several times a day which content to use with students; be it a you tube video, a piece of text, a rehearsal program, a game, a textbook chapter, etc...

Especially with respect to the selection of (digital) textbooks, we are interested in the influence that teachers have on the process, and whom they rely on.

What criteria do teachers use when selecting textbooks and educational media? Why do they use these criteria? How do they value criteria such as usability, appropriateness for their students, material learnability, and attractiveness? How do they gather information to determine if materials fit their criteria?

To answer these questions, we analysed the publications in the IARTEM Conference Volumes up to 2013 and IARTEM e-journal articles up to 2017.

In this chapter we present our findings.

THE INFLUENCE OF TEACHERS IN SELECTING TEXTBOOKS AND EDUCATIONAL MEDIA

The influence of teachers in selecting textbooks and educational media is partly dependent on the approval system that rules in a country. Earlier we presented a typology of approval systems based on Repoussi & Tutiaux-Guillon (Wilkens 2011):

Model A: There is no state approval needed

Model B: There is state approval needed and only one textbook per subject is allowed to be used

Model C: There is state approval needed and only a few textbooks are allowed to be used

Model D: There is state approval but schools may select also other textbooks

Model E: A mix of two or more of the above models

Apart from Model B, schools are allowed to select textbooks which fit their needs.

The question is how they use that allowance. Several researchers noticed that the whole selection process is rather intuitive:

"Teachers do not see themselves limited in their ability to choose textbooks by the marketing power of the publishing houses, but on the other hand, they feel that their responsibility lies more in the moment of choice than on the analysis and evaluation tasks" (Sousa & Lourdes Dionísio 2011, 109). Sikorova (2002, 85) sees a "serious problem, where there is no 'professional service' as a resource for teachers' decisions and teachers are **obliged to decide** and make this so often **intuitively."**. Vicente Álvarez & Rodríguez Rodríguez (2011, 101) also conclude that the selection of music and teaching materials is intuitive. According to them the main reasons are that the guidelines for evaluating materials are unknown and that "the economic interests of publishers and the most popular proposal influence the selection and use of materials over educational interests". Sousa & Lourdes Dionísio (2011, 109) also speak about "lack of proper criteria for selection".

Braga (2014, 17) states that their research verified that there are no specific meetings in most cases; the teachers meet up during the day – during the break, for example – and exchange ideas about the books they know or that are available for assessment.

If it is true that teachers do select their textbooks intuitively, other stakeholders probably have more influence on the process. Sousa & Lourdes Dionísio (2011, 109) state that although it appears that teachers participate more in school decision-making, it could be hypothesized that the selection of textbooks in schools is to some extent controlled by information delivered by publishing houses: "it could be concluded therefore that the school-based selection of textbooks is strongly controlled by the power of the market; however teachers may not always recognise this".

Besides the publishing industry, the state also influences the process. Although the prevailing procedure used in textbook selection in the Czech Republic is teachers' group decision-making, "the most external factor influencing the selection process was the presence of the Ministry of Education approval clause " (Sikorova 2005, 347). According teachers, their reliance is as follows:

Other teachers' opinions:	68%
Experimentation (try out):	64%
Reviews from independent institutions:	33%
Students' opinions:	30%
Information from publishers:	25%

These findings were supported by Braga (2014, 19). She found that beginning teachers in particular frequently reported that they follow the choices made by older or more experienced colleagues. Many teachers also prefer a known textbook that already has been used in another situation. Iversen (2014) states that student teachers are bearers of a tradition which leads to the reproduction of a distinct culture and therefore of the choice of teaching resources. Reichenberg (2014) also came to these figures. A survey of 319 teachers revealed the following ranking order:

1. Content

2. Past experience

3. Recommendations from colleagues

4. Readability

5. Price

6. Fairs

7. Commercials

So we see that the process of selecting textbooks is rather intuitive, where teachers heavily rely on other teachers, well-known textbooks, information from publishers and clauses of the Ministry of Education.

Despite this the question holds that if teachers decide more or less intuitively, what criteria do they (think they) use during that intuitive process?

WHICH CRITERIA TEACHERS USE WHEN SELECTING TEXT-BOOKS AND EDUCATIONAL MEDIA

Several researchers have studied the phenomenon of the criteria teachers use or think they use when selecting textbooks. We will present their findings and afterwards try to draw some conclusions.

Sousa & Lourdes Dionísio (2011, 110) found that the five most important criteria according to teachers were the following:

1. Scientific accuracy

2. Methodology able to facilitate and benefit students

3. Coherent and functional organization, structured from the students' perspective

4. Clear texts and appropriate to the teaching grade and student diversity

5. Adequacy to the development of skills included in the curriculum

Exarhos also found that Greek (science) teachers see textbooks as content full of "hands-on" activities. Reichenbergs (2014) survey of 319 teachers showed also content as the most important criterion, with readability as the second. Teachers of pupils with educational needs however thought that readability of texts was more important than content.

The difficulty and the level of the text are also criteria often mentioned by teachers.

Braga (2014, 18) listed the following elements favoured by teachers in their analysis:

— teachers of the first grades: size of the text and vocabulary

— comparing with the local curriculum

— image quality, text level and activity types

Sikorova (2002) came to this order of criteria for textbook selection:

1. Sufficiency of exercises and questions

2. Variety of texts and exercises

In this study, graphic and typographical parameters only ranked 10th. Sikorova argues that it would have been better to separate graphic from typographical parameters. Which is understandable, because other sources report that illustrations are seen as an important criterion. Striking, however, is that in her same study teachers of higher grades rank 'professional degree' as the highest criterion. Exarhos (2005) also reported the relevance of illustrations in helping students comprehend text (especially graphics and tables), which perhaps maybe especially true for science textbooks. On the other hand, language teachers value two learning functions significantly higher than science teachers: selecting content and instructional strategies (Reints 2011, Dingemanse 2011).

Besides content, text and illustrations, the variety of exercises and assignments is often mentioned (see Sikorova 2002, Braga 2014, Sousa & Lourdes Dionísio (2011). A very interesting phenomenon was seen by Exarhos (2005, 379). He found that "male teachers rate science experiments as the most important characteristic of a science textbook. Male teachers prefer experiments and an inductive teaching model. On the other hand, female teachers prefer a great number of different types of illustrations as a starting point for discussion and a text-driven model to teach science". The same results were shown in our own research in the Netherlands (Wilkens 2015).

With respect to the Netherlands, we conducted a study among student-teachers, asking them to rate relevant criteria. The results were as follows:

(N = 134) (Mean on a Scale from 1 tot 5)

	M	SD	Min	Max
Lay-out	3.98	0.79	1	5
Attractiveness	4.45	0.71	1	5
Linked to real life	4.33	0.69	3	5
Easy to work with	4.19	0.73	3	5
Linked to learning goals	4.28	0.72	2	5
Supporting learning process	3.71	0.81	2	5
Possibilities to differentiate	3.60	0.77	1	5
Cognitive load	3.31	0.74	1	5

Table 4. What Aspects do Student Teacher take into Account when Selecting Learning Materials
(unpublished presentation at IARTEM's Berlin conference of 2015; see also Werkman 2015)

What we see is that criteria connected to content (linked to learning goals, and linked to real life), score the highest, together with criteria that are connected with attractiveness. While criteria connected to textbook learnability (supporting the learning process, possibilities to differentiate, cognitive load) receive the lowest scores.

These scores are in line with the results of the latest nationwide monitor about teachers and textbooks where almost all teachers said that textbooks must be motivating.

Thus, it seems as though teachers do the following when selecting textbooks:

— are primarily content-oriented, especially in the higher grades

— check if textbooks are in line with the possibilities of pupils

— want textbooks to be attractive and motivating

Whereas they are less concerned about the learnability of textbooks. How can it be that the main function of textbooks has a minor place in the selection process by teachers? Let's try to find out.

WHY TEACHERS DO NOT USE LEARNABILITY CRITERIA WHEN SELECTING TEXTBOOKS AND EDUCATIONAL MEDIA

According to several researchers, teachers do not have knowledge about the quality of textbooks. Iversen (2014, 48): "Research shows that teachers state that they do not have enough knowledge about the quality of teaching resources and their importance in teaching. Individual schools have rarely developed criteria for the selection of teaching aids. According to Skjelbred (2003), possible reasons

for this may be that there is a lack of discussion about the quality of teaching resources in terms of professional goals and communication with students". Ivic et al. (2013) tell us what it means when teachers first select textbooks on the basis of their intuition, and then make a second choice based explicitly on formulated criteria: "In our experience, when we ask teachers to make a selection between two textbooks, first on the basis of their own spontaneous responses and following that on the basis of certain explicitly stated criteria, as a rule the choice made the second time is the book that was rejected the first time. This observation is a striking illustration of the serious problems posed by procedures and criteria for selecting textbooks (Ivic et al 2013, 197). The lack of knowledge of teachers is not surprisingly as "the evaluation and selection of textbooks are the activities the teacher is mostly not skilled for" (Zikorova 2002, 85).

In 2015 we designed a research project about *What teachers know about the quality of textbooks and educational media*. Our research question was: What do (student)-teachers know about the quality of learning materials? More specifically we were interested in the question if student-teachers (4th grade) were able to judge which multimodal learning materials would contribute to an effective learning process and which would not?

We presented different materials where relevant design principles were used or not and we asked the student-teachers which of the two would help students in their learning and which would not.

The results were as follows (see Reints 2015; Werkman 2015):

Design principle		Frequency	*M*	%
Multimedia principle	false	27	0.2	10
	good	241	1.8	90
Modality principle	false	60	0.45	15
	good	342	2.55	85
Contiguity principle	false	59	0.44	15
	good	343	2.56	85
Redundancy principle	false	305	2.28	76
	good	97	0.72	24
Coherence principle	false	283	2.11	70
	good	119	0.89	30
Total	false	734	5.48	39
	good	1142	8.52	61

Table 2. Scores per Design principle (N=134)

The student-teachers chose the right learning material if it comes to multimodality, media- and the contiguity principle. Whereas they chose the wrong learning material if it comes to redundancy and the coherence principle. The last two principles are heavily associated with the principle of "Less is More". We also asked the student-teachers to score criteria they would use when selecting textbooks (see above). We found a strong correlation between the wrong choices regarding the design principle and the attention given to the criterion of textbook and educational media attractiveness.

These findings are in line with the experiences of the researchers referenced above.

Thus, it seems that teachers indeed have too little knowledge to take weighed decisions about the selection of textbooks and educational media. And it is probably for this reason that they do not use important criteria connected to the learnability of textbooks.

Who should make these decisions according to teachers? Let's see what teachers say about this.

WHAT ABOUT EXPERTS AND PUBLISHERS IN THE SELECTION PROCESS?

First of all: The evaluation process by external experts is not seen as a threat to quality. "In fact 56% of the teachers agree that evaluation committees will ensure quality" (Sousa & Lourdes Dionísio 2011, 107). And: "In fact, 83,9% of the teachers (strongly) agree that the approval system will contribute to the improvement of quality on education" (Sousa & Dionísio 2011,108).

In a Dutch nationwide survey, it appeared that 50-60% of the teachers want to be informed if a textbook has proven effect in the learning process (Reints 2015).

Based on these findings, Sousa & Lourdes Dionísio (2011, 107) stated that they "contradict the position of those publishers who refused the evaluation system because it implied mistrust of teachers". Two years earlier, these researchers already concluded that "According to the publishers' point of view the educational "damage" (of letting experts judge, AR/HW) will consist of an educational stagnation and the results of the students will get worse (Sousa & Lourdes Dionísio 2009, 492). And: "Publishers also make the comparison with other countries where teachers select the materials. The country development comparison here makes teacher's skills a decisive argument" (Sousa & Lourdes Dionísio 2009, 491). Above we mentioned that it is not reasonable to think that teachers indeed have enough skills to select textbooks on a weighed basis. Sousa & Lourdes Dionísio do not hold this opinion either: "Teachers agreed (74,61%) that there were problems with, and lack of quality in textbooks. This calls into question publish-

er's arguments supporting the quality of the textbooks they produce, and which also claimed that teachers' choices were the best indicators of quality" (Sousa & Lourdes Dionísio 2011, 109)

In a research project we carried out to investigate if different stakeholders weigh criteria differently, we found that publishers value two learning functions significantly higher than pupils and teachers: modalities and illustrations (Reints 2011; see also Dingemanse 2011). From the point of view of publishers, this seems understandable because both make textbooks more expensive.

The conclusion of Sousa & Lourdes Dionísio (2009, 495): "In conclusion, it might be said that the publisher's discourse about the evaluation of textbooks may represent an ongoing process of recontextualization, through which a certain organization (the school) and its discursive field is being colonized (sic!). This means that publishers also assume in their discourse to be the 'voice' of teachers, their hidden intent is that their discourse might be appropriated by the school and its actors and become naturalized as their own voice".

Therefore, it seems that teachers have no problem with independent expert judgments.On the other hand, publishers think that they know what teachers find important, but this seems not to be so. To be sure that learnability criteria play an important role in the selection process, independent expert judgments are inevitable.

AND THEN WE HAVE THE TEACHER TRAINING INSTITUTES...

Several researchers point out that it is necessary for teachers to be better trained in selecting textbooks. Exarhos thinks there is an "urgent need" for in-service training for Greek primary teachers on the criteria used to select a science textbook" (p. 380). Reichenberg (2014, 88) underlines the need to focus on how to choose teaching and learning materials in teacher education".

Braga (2014, 21) also wants cooperation with universities: "It is necessary to propose some activities on textbooks for teacher education programs. Besides these specific courses, we suggest the production of materials in collaboration with universities and schools. The aim behind this idea is to construct didactic and epistemological knowledge that could guide teacher's actions, helping to select textbooks in a more grounded way". Thus, Braga combines the upgrading of teacher's skills with expert involvement.

Ivic et al. (2013, 97) present an interesting solution: "Due to the complex process of meaningful selection of textbooks, committees of local teachers for a particular subject (…) might best be equipped for the task. Teachers must be given the adequate training to provide them with the competencies needed to make the selection. These important professional competencies have been neglected in

teacher training (…)." So they combine the upgrading of teacher's skills with local teacher committees.

SUMMARY

Above we have traced research by IARTEM (related) researchers. The analysis of course is based only on their research. However we found some interesting points of discussion. First, it seems that the selection process of textbooks and educational media is rather intuitive, and that learnability criteria play a minor role in this process. It looks as if teachers have too little knowledge to use these criteria, and that expert judgment would be a welcome aid for teachers. An aid that publishers do not see as necessary. Independent expert judgments, combined with teacher training must be the solution to make the selection process more weighed and to heighten the quality of textbooks and educational media. Because, in the end, publishers will always follow the market…

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THE ASSESSMENT OF TEXTBOOKS

TOM WIKMAN

What is a good textbook? This chapter examines the assessment of textbooks in relation to school subjects like history, geography and biology, in which texts usually have been the primary medium for the transmission of information. The need for scrutinizing research on textbook quality has grown as central school authorities in many countries have moved the responsibility for quality assessment to publishing houses and teachers (cf. Pudas 2013). Research on learning motivates two central parameters for the assessment of textbooks: coherence and appropriateness. As textbooks are strongly influenced by values from the country of their origin, there is also interest in examining the accuracy of textbooks.

ACCURACY - IS IT TRUE?

The author of a recently published book about the nature of knowledge included the following statement in the title: *There are no witches* (Jarrick 2017). The reason for stating certainties like this is obvious, as also world leaders from the so-called free world intentionally and transparently disregard truth. One can however claim that "fake news" is a well known heritage from European history. Wikman (2005) showed that textbooks from a totalitarian context, the example taken from the German Democratic Republic, on a superficial level could be considered highly beneficial for learning. On a deeper level, the concepts however were without clear connections to real life. An analysis of the assessment of textbooks therefore can start with the question of whether one can rely on the texts or not.

Attention can be directed towards the consistent and constructive work initiated by Georg Eckert, continued by the institute bearing his name. The aim of his work was to free textbooks from enemy images and stereotypes in order to promote international understanding and peace (Fuchs & Sammler 2015). Migration movements mixing different conceptions about the dissemination of information emphasizes the need for evaluation focused on cultural understanding. The work of the Georg Eckert-institute shows that efforts focused on reconciliation and "un-fakeification" is continuously re-emerging because of nationalistic endeavors replacing old prejudices by new ones at various locations in the world. A key issue is how conflicts affect textbooks and how it can be avoided that textbooks themselves contribute to the emergence of conflicts.

Comparative studies can reveal prejudices also in texts with an objectivistic ambition. For instance, Holmén (2006) compared Cold war period textbooks in Norway, Sweden and Finland and identified a link between state foreign policy and textbooks' accounts of the USA and the Soviet Union. Holmén claims that in Finnish textbooks the Soviet Union was described in less critical terms than in Norwegian and Swedish books. The influence on textbooks was accomplished mainly through the social climate in society, as the authors adapted the writing to what was considered politically correct. Holmén deduces this process from the fact that textbooks were politically sensitive and adapted rapidly to changes in what society considered politically correct. The interpretation in the Finnish textbooks can be understood as an adaptation to the problems encountered when living close to a big neighbor. As a background, one could remember that the second world war period in Finland started with a kind of fake news when Soviet artillery fired projectiles towards the Soviet village Mainila and claimed the Finns were culpable of the incident (Meinander 2012). At least this version is presented in Finnish textbooks. The road to a common interpretation in textbooks accepted in both Finland and Russia could to be long and winding. Similar results to Holméns were found by Bagoly-Simó (2017). He compared presentations of Eastern Europe in textbooks from the United States, Spain and Switzerland and noticed that school geography textbooks reflect the priorities of the place of publication.

What can be done if an agreed upon truth is so hard to attain? Aiming at developing independently thinking human beings, an active approach can be supposed of the reader as suggested by Beck and colleagues (1997). If the whole reading process is considered as a critical endeavor where the author is continually questioned, the ability to identify falsifications and prejudices might be improved. This means that assessing accuracy is delegated to the user of the textbooks. Another approach is suggested by Mikander (2016) who claims, that in Finnish textbooks the people of the North seldom are described as accountable for the scarcities in the South. She suggests teaching about privilege for revealing and challenging common assumptions that cover the historical and structural roots of post-colonial relations. Further, the French-German history book project exposed a brilliant way to deal with interpretational differences between neighboring countries (cf. Duménil et al 2008). The aim of the project was to present historical facts as free from values as possible. According to the project aims, the change in perspectives calls on students to take different perspectives and form their own judgment.

Although a final commonly agreed upon truth, except for the lack of witches, can be hard to attain, one could agree with Aristotle's *Rhetoric* that reasoning should be employed from opposite sides of a question in order to see clearly, what the facts are. Indeed a good, more than 2000-year-old, starting point for assessment.

COHERENCE – DOES IT STICK TOGETHER?

The writing of text is a process of exposing thoughts. From classical works in educational science we know that the reader's knowledge is not simply piled up in memory, but has a certain structure (cf. Bruner 1973). An assessment of texts then has to scrutinize if the thoughts in texts are connected comprehensibly (cf. Nyström 2001; Roseman, Stern and Koppal 2010).

In order to understand the assessment of texts from a coherence perspective some background about the reading process is needed. A reader tries to find connections in a text and to combine small units to larger ones. The reader develops hypotheses and makes inferences during the reading (Beck & McKeown 1991; Hellspong & Ledin 1997). The reader is forced to improve a text that is not coherent, which makes reading difficult (Beck et al 1989). Coherence can according to Nyström (2001) however be invisible and a result of the reader's activity when reading. Even if cohesive markers can be seen as tools for developing coherence, a coherent text does not necessarily encompass many cohesive signs. Merely adding cohesive ties cannot guarantee that the quality of the textbooks is developed. The evaluation of the coherence of a text is challenged by the fact that texts are situational and give the reader's prior knowledge a central role for understanding the text. Readers with good prior knowledge manage with brief instructions. Vidal-Abarca et al (2004) underline the need to deepen the analysis of coherence. When arguments overlap, the readers make fewer inferences and consequently the text processing can be shallower. The essential process is to make readers connect the message of the text with their prior knowledge, thus intensifying inference and deep learning.

Different research groups have pointed at the paradoxical fact that structuring of text gives different results depending on readers' prior knowledge. According to Roller (1990) good effects are achieved if the reader has a modest knowledge of the content in the text. McNamara, Songer and Kintsch (1996) found that readers who know little about a domain benefit from coherent texts, while readers with high-knowledge benefit from minimally coherent texts. This could be explained by the fact that poorly written texts force knowledgeable readers to engage in compensatory processing. The results are however not clear-cut, as for instance Gilabert, Martínez and Vidal-Abarca (2005) did not identify the same relation between coherence and prior knowledge.

Despite the importance attributed to coherence for student learning, adequate methods for analyzing the presentation of ideas in textbooks are missing according to Roseman, Stern and Koppal (2010). They reported a project aiming at analyzing the degree to which high school biology textbooks provide students and teachers with a coherent account of significant topics within the curriculum. The example taken by the researchers was which types of sequential or non-sequential rela-

tions between concepts of matter and concepts of energy could be found in text-books. This method of assessment which specifically analyzed how ideas where connected within the studied topics produced consistent results across reviewers. Roseman, Stern and Koppal (2010) emphasized that if the aim is deep learning, an analysis based on the scientific core within an area is needed.

The use of ICT for the analysis of coherence has taken promising steps. Vidal-Abarca et al (2002) described the software Expository Text Analysis Tool (ETAT) as an encouraging tool that followed three steps, including a segmentation of a text into nodes, the classification of the nodes and the linking of the nodes with relational arcs. Another more recent program, EssayCritic, that provides feedback about co-herence in students' texts is described by Gilje et al (2016). Despite the potential, the use of qualitative computer based methods to analyze the coherence of expository texts seems to be rather limited. Perhaps the reason lies in the challenges of collect-ing data and in coding reliability as Vidal-Abarca et al (2002) stated.

As most school children read science texts as novices, well-structured texts with good coherence can be supposed to enhance the learning of the reader. As-sessment of coherence in textbooks needs to be accomplished at different levels, both at the superficial level of the language, as different kinds of signs can guide the reader through the text, and on a deeper subject focused level where the struc-tured interplay between concepts is to be revealed. In order to accomplish this, deep domain specific knowledge is needed.

APPROPRIATENESS - DOES IT MATCH STUDENTS´ ABILITIES?

The classical works of educational science teach us that reader's prior knowl-edge should be attributed crucial importance for learning (cf. Ausubel 1968). Good texts meet the reader's prior knowledge with an optimal cognitive load (cf. Vygotsky 1962). This fundamental starting point challenges classroom practices as any school group presents various abilities among the students. Readers with good knowledge of a subject manage to develop hypotheses and make inferences needed for comprehension with short instructions (Nyström 2001). Comprehen-sion is however affected by other factors than prior knowledge. Gilabert, Martínez and Vidal-Abarca (2005) underline that developing good texts is a complex issue because of the many variables influencing comprehension. Text revisions done by the researchers showed that enhancing the readers' inferential activity was ben-eficial for all readers. The promotion of mental activity during reading, which is considered as the core of learning from text, is said to be the reason for this. Inferential activity is contrasted to the mere explicit-making of text ideas, which, according to research done by McNamara et al. (1996) did not give good results with knowledgeable students. The following three examples from different stages of the school system complement the research of McNamara and colleagues.

In the first one Jitendra et al. (2001) studied four middle school geography textbooks and found that the textbooks were written on a level that significantly exceeded the grade level of the intended audience. The researchers not surprisingly stated that the textbooks were not equally supportive for all learners and posed a significant challenge for students who enter middle school, especially for students who speak English as a second language. According to the researchers, the texts need supplementary explanations focusing on key concepts and principles to be used in class. If the students need road maps for studying the texts, it is no wonder that the providing of formative assessment has significant effects on student learning (cf. Hattie 2009).

The second study, by Ozuru, Dempsey and McNamara (2009), analyzed how text features and readers' individual differences contribute to biology text comprehension. The results showed that college students reading a high-cohesion text improved their text-based comprehension. The overall comprehension was also positively correlated with participants' prior knowledge. The degree to which participants benefited from reading a high-cohesion text depended on participants' reading skill, such that skilled participants gained more from high-cohesion text.

Ozuru et al (2009) also underline the difference between reading texts in biology and texts in history, for instance. The reading of texts in biology and other natural sciences might be challenged by the fact that most readers lack familiar concepts related to the topics. Enhanced scaffolding with the help of increased cohesion might be hard to accomplish if reading skills do not match the intellectual challenges presented by the text. The research by Ozuru et al (Ibid.) indicates that textbook evaluations need to take into account the differences between subjects and to differentiate between the reader's prior knowledge and reading skills.

Finally, Ainsworth and Burcham (2007) investigated the impact of text coherence on learning by self-explanation at university level. Learners that read coherent texts learnt more but low-coherent texts increased the number of self-explanations by the learners. The self-explaining in the low-coherence texts compensated for weaknesses in the text. A surprising issue was that the researchers considered that self-explaining of the highly coherent texts might have led learners to detect weaknesses in their explanations.

CONCLUSION

The research presented in the chapter shows promising connections between research on textbook quality and textbook development. Research however also shows the need for a further systematic long-term development of textbooks in relation to research. Berkeley, King-Sears, Hott and Bradley-Black (2014) replicated an old study by Armbruster (1986) and concluded that although the coherence in texts had been improved, enhancements still needed to be done. The study

by Berkley and colleagues as well as an analysis of Roseman, Stern and Koppal (2010) showed that there is a need for science materials to be rigorously evaluated before broad use in schools.

The work by the Georg Eckert Institute is a good model for revealing nationalistic biases in textbooks. Internationally orientated comparative analyzes also generally seem to be fruitful for quality improvement. In finding the adequate requirement level for texts, field research and investigations about students' views are essential for textbook development. For the assessment of textbook coherence, ICT shows promising potential. The writing of textbooks, like the writing of any books, continues to be a form of art, which cannot be captured by algorithms. The assessment of accuracy, coherence and appropriateness of schoolbooks is however necessary in any society.

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NORWEGIAN AND SWEDISH TEACHERS' CHOICE OF TEXTBOOKS IN A DEREGULATED SYSTEM

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Several Swedish and Norwegian scholars have suggested that in deregulated textbook systems, such as those in Sweden and Norway, teachers' choice of textbooks will come to be dominated by the textbook market. Market domination implies that teachers' textbook choices are likely to be governed by, for example, financial scarcity or pressure from salespeople. However, these statements are often bereft of empirical verification. In fact, we know little about what guides Swedish and Norwegian teachers in their choice of textbooks and other teaching materials.

Consequently, the *purpose* of our paper is to compare Swedish and Norwegian teachers´ choice of textbooks in two deregulated systems. We will also describe how teachers differ in their textbook choices with regard to special educational qualifications, experience and age.

During the era of textbook regulation in Sweden and Norway, there were official approval schemes. In Sweden the following aspects had to be examined: cost, content, the language (readability) and design of the textbook. During the period 1974-1983, it was also compulsory to examine objectivity in Swedish social science textbooks. In Norway: content, pedagogy, language and gender equality were examined.

Our results suggest that Swedish and Norwegian teachers seem to follow, at least partly, the same criteria in the era of deregulation: readability, content and past experience. Thus, our results indicate an inaccuracy in scholars' suggestion that Swedish and Norwegian teachers would be dominated by the textbook market during deregulation.

INTRODUCTION

Many countries have transitioned from regulated to deregulated textbook systems. In a regulated system, the state often has significant influence over textbooks. However, regulated systems can differ (Wilkens, 2011). We address this later in this paper.

Deregulated systems highlight the role of the teaching profession in rating and choosing between textbooks. Teachers, as a profession, are given greater power to choose which textbooks tomorrow's citizens will be exposed to (Johnsson

Harrie, 2009; Skjelbred, Askeland, Maagerø & Aamotsbakken, 2017). However, differences may exist between countries with regard to deregulated textbook systems (Mitani, 2012).

This fact brings attention to the seldom studied topic of how teachers choose textbooks in a deregulated system. When Sweden and Norway transitioned to a deregulated system, several scholars suggested that teachers would come to be dominated by the textbook market. Teachers' choice may, for example, be governed by financial scarcity or pressure from salespeople (Holmén, 2006; Johnsson Harrie, 2009; Långström, 1997). However, these statements were often bereft of empirical verification. The reality is that little is known about what guides Swedish and Norwegian teachers in their textbook choices. More specifically, we know little about how Swedish and Norwegian teachers' textbook choices come to be distributed among teachers.

Consequently, the *purpose* of our paper is to compare Swedish and Norwegian teachers´ choice of textbooks in two deregulated systems. We will also describe how teachers differ in their textbook choices with regard to special educational qualifications, experience and age.

We are guided by the following research questions:

- How do Swedish and Norwegian teachers use their autonomy to choose textbooks?

- To what extent do teachers' ranking of textbooks differ with respect to special educational qualifications, teaching experience and age group?

BACKGROUND: FROM TEXTBOOK REGULATION TO DEREGULATION

In an article in the IARTEM e-journal, Wilkens (2011) examined textbook regulation systems in various countries in relation to educational outcomes. In her study, Wilkens used a typology developed by Repoussi and Tuitaux-Guillon (2010), which distinguishes between five textbook approval systems: Model A to Model E. Model A has no state influence; Model B has state approval with one book per subject; Model C has a moderate state influence; Model D a weak influence and Model E a mixed influence. While several countries in the Repoussi and Tuitaux-Guillon typology have transitioned from a strong system of textbook regulation to one of no state approval, other countries have chosen different systems. Let us consider some examples.

Although the state has only a moderate influence, Japanese textbooks are screened and regulated during the production phase. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) examines them in accordance

with textbook examination standards following deliberations within the Textbook Approval and Research Council (Mitani, 2012). Canada has a system of weak state influence, however, there is The Trillium List, which contains the titles of those textbooks approved by the Minister of Education for use in Ontario schools (Ministry of Education. Ontario, 2008). About half of the 50 American states have some sort of local examination of textbooks that limits which textbooks can be used in the state's public schools (Guidelines for Local Textbook Approval Approved by the Virginia Board of Education, 2011).

In Portugal, there was no textbook evaluation prior to 2006. The marketing of textbooks was uncontrolled, while the selection of titles was the responsibility of schools and teachers. There were many textbooks on the market, and teachers began to express difficulty with the selection process. The situation led to the Portuguese Ministry of Education initiating a series of actions, among which was textbook evaluation (de Sousa & Dionísio, 2010).

Sweden has transitioned from state approval system to no state approval. From 1938 to June 1974, reviews were compulsory for all textbooks used in school. From July 1974, reviews were compulsory only for textbooks and teaching aids in the social sciences. There was an official Swedish approval scheme, according to which the following four aspects had to be examined in relation to textbooks: *cost*; *content, language and design.* In other words it was important for textbooks to have good pedagogical design, good readability [1] and cover the topics to be treated at school. During the period 1974–1983, it was also compulsory to examine *objectivity* in social science textbooks (Johnsson Harrie, 2009; Långström, 1997).

In Norway, there was also an approval system 'godkjenningsordningen'. Four aspects were examined: whether the content of the textbooks was in line with the subject's curriculum, pedagogy, language and gender equality. It was not until 2000 that the approval system was abolished in Norway (Bratholm, 2001; Skjelbred et al., 2017).

Following deregulation, Swedish and Norwegian teachers were exposed to an excessive amount of teaching and learning materials (Långström, 1997; Skjelbred et al., 2017), propelling them as important actors in decisions regarding textbooks (Bratholm, 2001).

FRAMEWORK: THEORIES OF PROFESSIONS

Our research questions are motivated by theories of professions. The minimalist definition of a profession points to an occupation that requires scientific-based work, for instance, making professional judgements about which textbooks

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[1]   Readability refers to the ease with which a text is understood by its readers (Lundberg & Reichenberg, 2009).

and teaching materials to use. Consequently, most professions require a university education of at least three years. Therefore, teachers and special educators pertain to professions (Brante, 2011).

Professions can oppose both the state and the market. In opposition to the state, teachers may resist regulations. In opposition to the market, teachers may wish to protect their 'clients' (students, parents) instead of treating them as 'customers'. We measure the strength of teachers as professionals by their autonomy in professional judgments in relation to state regulation and the market. The autonomy of professions stems from their education, work life experience and collegial support (Brante, 2011). In teacher research inspired by theories of professions, one additional determinant tends to be cited, namely teachers' age. Age indicates both differences in life experience and resistance to change (Hargreaves & Fullan, 2013).

In this paper, we argue that Swedish and Norwegian teachers are important actors in the deregulated system. However, the degree of autonomy depends on their *education, special educational qualifications, years of experience and age group.* The study contributes towards filling the knowledge gap regarding teachers as active actors. In the next section, we will discuss the current state of research on teachers' choice of textbooks.

TEACHERS' CHOICE OF TEXTBOOKS IN DEREGULATED SYSTEMS – A REVIEW

While considerable research exists on textbook content, especially representations of gender, minorities and readability (Lundberg & Reichenberg, 2009; Mills & Mustapha, 2015; Skjelbret et al., 2017), less research is available on how teachers choose textbooks in deregulated systems. Nevertheless, there are some exceptions. For instance, Bueie (2002) found that only three percent of the (Norwegian) schools in her study had constructed criteria for the choice of teaching and learning materials. Furthermore, the teachers in Bueie's study of learning materials were exposed to 44 different criteria. Ultimately, five criteria were ranked as relevant: facts, linguistic quality, content, curricular standards and exercise. Skjelbred (2010) found that teachers had a strong conviction that the quality of textbooks was good. Furthermore, Justvik (2012) interviewed teachers and students at 18 Norwegian schools about choices of teaching and learning materials and found that teachers did discuss the evaluation copies of textbooks. Moreover, the homepages of textbook publishers and teachers´ habits strongly influenced teachers choices. Sousa and Dionísio (2013) applied a questionnaire to ask 340 Portuguese teachers to state their level of agreement with arguments concerning the editing, selection and evaluation of textbooks. The teachers recognised the important role of the approval system since 2006 in improving the selection process of textbooks (see de Sousa & Dionísio, 2010).

In one exploratory study, 40 teachers in Northern Sweden were asked to fill in a questionnaire comprising both open-ended and closed questions. For the open-ended questions, teachers were asked to write down how they chose textbooks. The closed questions sought information about the teachers' background characteristics, education, years of experience and sex. In this study, teachers' textbook choices were dominated by the market (costs), cultural capital (education and epistemic beliefs) and internal and external social networks, e.g. collegial recommendations and book fairs. Very few mentioned the importance of easy-to-read texts or of reading current textbook research (Reichenberg, 2013. See also Reichenberg & Löfgren, 2013).

Inspired by Reichenberg (2013), Reichenberg (2014) constructed a questionnaire and asked 319 Swedish teachers to rank their textbook choice on the basis of content, easy-to-read, cost, collegial recommendations, past experience, book fairs, and salespeople. The teachers included in the non-random sample taught grades 1 to 12 and came from both Western and Eastern Sweden. Although self-reported motives have the drawback of being subjective, subjective measures may nevertheless be the most appropriate way to study teachers' choice motives. With regards to investigating choice motives, no objective measures exist, and teachers can be considered experts on their own choices.

In Reichenberg (2014) a pattern opposite to that of Reichenberg (2013) was found. Surprisingly, the market did not seem to influence teachers at all. On the contrary, cost- and sales-related considerations were ranked as least important, with the Swedish teachers ranking content as most important. In other words, the teachers safeguarded the pre-1992 criteria (Långström, 1997). They ranked past experience as the second most important factor and collegial recommendation as the third most important. In the next section, we will provide new data from a Swedish-Norwegian survey.

SAMPLE AND DATA ANALYSIS OF TEACHERS' CHOICES

The data were collected using the same sampling frame (teachers in grade 0 to 9) and strategy for both countries so as to ensure comparability. The data collection was restricted to two areas: one in southeast Norway and the other in Western Sweden.

The sample consisted of 236 Norwegian teachers in 10 schools and 340 Swedish teachers in 14 schools. The teachers were recruited through a respondent-driven sampling strategy (non-random), with student teachers asked to mediate contact with their respective schools. We compared Sweden and Norway because of their similarities. Both countries have a social democratic welfare state, despite various liberal policy changes from the 1990s onwards, and a tradition based on strong citizen support for social security policies (Svallfors, 2004). Both countries have modern comprehensive schools with large secondary and tertiary sectors.

We designed a questionnaire with questions on teacher background and attitudes towards textbooks and other teaching materials. In the survey questions used for this study, the participants were asked to rank their textbook choice on the basis of content, easy-to-read, cost, collegial recommendations, past experience, book fairs, commercials, book reviews and research on a 7-point Likert scale ranging from not at all true for me (1) to completely true for me (7). The study will aid us in answering our first and second research questions.

HOW SWEDISH AND NORWEGIAN TEACHERS RANK MOTIVES REGARDING CHOICE OF TEXTBOOKS

We begin with our first research question: How do Swedish and Norwegian teachers use their autonomy to choose textbooks? In this Swedish–Norwegian survey, we again found evidence (listed in Table 1, last row) that the market does not influence teachers' textbook choices. On the contrary, salespeople and cost were of marginal importance, ranking about 2.9 and 2.5, on average, respectively, on a 7-point scale. Cost mattered somewhat more for Swedish teachers, at an average of 4.3, than it did for Norwegian teachers, with an average of 2.9 points.

Table 1. Means by country on a 1 to 7 rating scale with 'agree' and 'disagree' differentials for textbook choice by country, teaching experience and special educational qualifications.

Sweden

	Content	Easy Read	Cost	Collegial Recommend.	Past Experience	Book Fairs	Salespeople	Research	Book Reviews
Special Education									
No	6.4	5.3	4.3	5.2	5.8	4.4	2.9	4.7	4.2
Yes	6.3	5.5	3.9	5.3	5.7	4.8	3.2	5.5	4.4
Experience									
Low	6.1	5.3	4.2	5.2	5.5	4.2	2.8	4.4	4.1
Intermediate	6.5	4.9	4.3	5.0	5.9	4.3	3.0	5.0	4.1
High	6.5	5.7	4.3	5.4	6.1	5.0	3.0	5.0	4.5
Sweden Total	6.4	5.3	4.3	5.2	5.8	4.4	2.9	4.8	4.2

Norway

	Content	Easy Read	Cost	Collegial Recommend.	Past Experience	Book Fairs	Salespeople	Research	Book Reviews
Special education									
No	6.7	5.7	2.9	5.2	5.9	3.7	2.5	5.0	4.3
Yes	6.7	6.2	2.8	5.5	6.2	4.1	2.6	5.9	4.6
Experience									
Low	6.7	5.8	2.9	5.4	5.9	3.7	2.4	5.0	4.2
Intermediate	6.7	5.9	2.8	5.3	6.0	3.8	2.6	5.3	4.3
High	6.6	6.0	2.9	5.3	6.1	3.8	2.7	5.4	4.6
Norway Total	6.7	5.9	2.9	5.3	6.0	3.8	2.5	5.2	4.3
Norway-Sweden Total	6.5	5.5	3.7	5.2	5.9	4.2	2.8	5.0	4.3

If neither cost nor book fairs matter, then what matters for teachers when choosing textbooks? In Reichenberg (2014), the teachers assigned the highest rank to the content of textbooks. As presented in Table 1, Swedish and Norwegian teachers also assigned the highest rank to the content of textbooks, on average. This finding was not unexpected, since researchers have demonstrated that a prerequisite for getting pupils to read a textbook is to get them motivated (Retelsdorf, Köller & Möller, 2011). The finding also seems consistent with theories of professions, as teachers supposedly act autonomously (Brante, 2011). Consequently, teachers' choice motives point to textbooks that have relevant content, aiding in motivating pupils. The second highest rank in 2014 was assigned to past experiences with textbooks. In Table 1, this result was also true for the Swedish–Norwegian study. Again, the finding also seems consistent with theories of professions regarding how professions exercise their autonomy based on professional judgement (Brante, 2011).

So far, we have reported findings from teachers as a homogenous profession, but if we differentiate subject teachers from special educators, for example, would there be any differences? This will be discussed in the next section.

SPECIAL EDUCATIONAL QUALIFICATIONS, TEACHER EXPERIENCE AND AGE MOTIVES IN TEXTBOOK CHOICE

We continue with our second research question: To what extent do teachers' ranking of textbooks differ with respect to special educational qualifications, teaching experience and age group? We start with descriptive statistics in this section and will continue with inferential statistics in the next section.

Firstly, it is important to note that Swedish and Norwegian special educators [2] have received comparatively more education than their counterparts in other countries. In both countries, it is an advanced level education. Thus, besides having a teaching degree for mainstream schools, they also have a degree as special education teachers, and in Norway, the major part of training in special education teaching is at the MA level (Hausstätter & Takala, 2008).

According to Table 1, both Swedish and Norwegian special educators and subject teachers ranked content as the most important aspect when choosing textbooks. However, when it comes to readability (easy-to-read), there are notable differences. Norwegian special educators ranked, on average, the readability of textbooks substantively higher, compared to subject teachers. Special educators in both countries also ranked current research higher, compared to subject teachers. Furthermore, special educators in both countries ranked visits to book fairs higher than did subject teachers. Swedish subject teachers ranked costs higher than did special educators.

Teacher experience is an often-cited predictor in American educational research; the more experienced the teacher, the greater his or her professional knowledge of textbooks (Hargreaves & Fullan, 2013). Regarding teachers' experience in the field, we mean the number of years they have been teaching.

In Table 1, Swedish teachers of intermediate or high levels of experience awarded a higher rank to the content of textbooks than did teachers with low levels of experience. This is quite different from the results reported in Reichenberg (2014). According to Table 1, the more Swedish teachers gained experience, the higher their ranking of past experience. We also note that the more experienced teachers ranked current research and textbook reviews as a motive for choosing textbooks. Moreover, those teachers with low and high levels of experience awarded a higher ranking to the readability of textbooks, compared to teachers with intermediate levels of experience. This suggests an inverse U-relationship between readability and experience. So far, we have discussed means, but we are also interested in the precision of our estimates. Next, we turn to inferential statistics because we want to obtain confidence intervals for our estimates.

A LINEAR REGRESSION MODEL OF TEACHER MOTIVES IN TEXTBOOK CHOICE

To evaluate country differences with multiple outcomes (in terms of textbook choice), we also conducted a one-way MANOVA,[3] which indicated a joint statistically significant difference between countries in textbook rankings at an alpha level of 5%. Countries explained roughly 28% of the variance in rankings. A one-way univariate ANOVA indicated a statistically significant difference in

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[2] Special educators are teachers with special educational qualifications

[3] The residuals were jointly multivariate and normally distributed, with the error variance being equal.

mean rankings for: *salespeople, research, fair information, past experience, cost of textbooks, easy-to-read,* and *content* at an alpha level of 5%. However, we did not adjust for multiple comparisons in the later analysis.

To get a better sense of our teachers' textbook choices, we estimated a series of linear regression models. We focused on four outcomes that seemed to differ substantially in the descriptive statistics: research, easy-to-read, past experience and book fairs.

Although the outcome is a rank variable and is, thus, ordinal, we treated it as an interval variable. A linear regression is easier to interpret than an ordinal regression, with its large number of response categories. Similarly, we could have specified a system of equations of linear regression using generalised squares with a seemingly unrelated regression. However, we focused on techniques that are more familiar to readers. Finally we added age groups to the model (Figure 1).

Figure 1. Plots of Coefficient from Linear Regression. With 95% Confidence Intervals (C.I.).
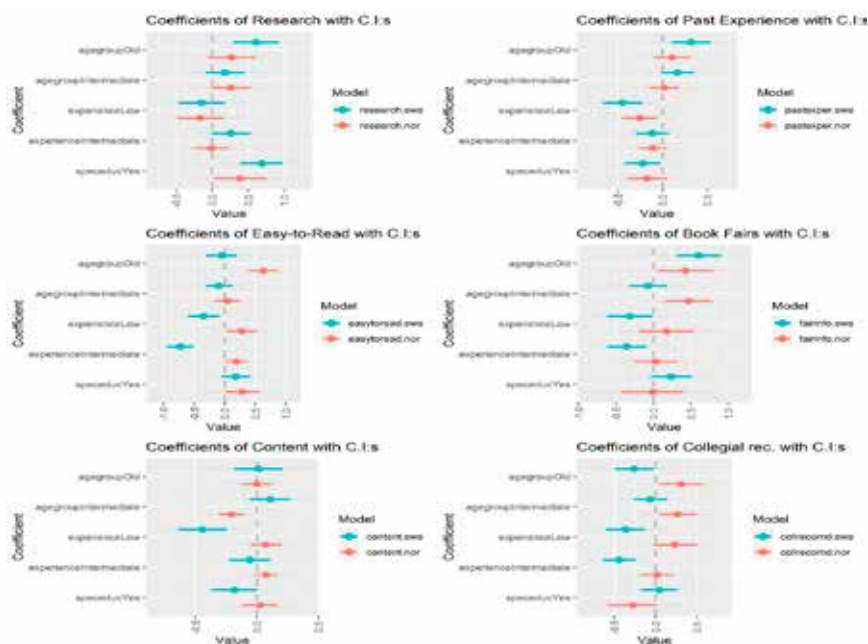
We interpret Figure 1 as follows. The 'dots' therein are the estimated coefficients from the linear regression. The 'bands' are the 68% and 95% confidence intervals. If the confidence interval does not overlap with zero, then we know that the estimates are statistically significant from zero. However, the converse is not necessarily true. We focused on four outcomes: research, past experience, easy-to-read and book fairs.

- In Sweden, compared to other educators, special educators ranked research higher, on average, adjusting for other predictors.

- In Sweden, compared to highly experienced teachers, teachers with intermediate experience ranked past experiences at a higher level, on average, adjusting for other predictors.

- In Norway, compared to young teachers, middle-aged teachers awarded a lower rank to easy-to-read, on average, adjusting for other predictors.

- In Sweden, compared to young teachers, older teachers ranked easy-to-read at a higher level, on average, adjusting for other predictors.

- In Sweden, compared to young teachers, older teachers ranked fairs at a higher level, on average, adjusting for other predictors. [4]

- In Sweden, compared to highly experienced teachers, inexperienced teachers ranked content at a lower level, on average, adjusting for other predictors.

- In Sweden, compared to highly experienced teachers, teachers with intermediate levels of experience ranked collegial recommendation at a lower level, on average, adjusting for other predictors.

In summary, first, the results indicate that there may be country differences, suggesting that the degree of professional autonomy differs between Norwegian and Swedish teachers. Second, the results indicate that professional traits do make a difference in the ratings of textbooks, which answers our second research question. In the next section, we will discuss our results and connect them to previous research and theory.

DISCUSSION AND FUTURE RESEARCH

The *purpose* of our paper is to compare Swedish and Norwegian teachers' choice of textbooks in two deregulated systems. We will also describe how teachers differ in their textbook choices with regard to special educational qualifications, experience and age.

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[4]   All models had the same error variance across teachers. However, some variables had skewed residuals, in particular, in Norway, which may have biased the standard errors. We re-fitted the models (not shown) with bootstrap and robust standard errors (Huber White estimator). All results held except for the ratings of fairs. We proceeded to re-fit the model with a re-scaled response for book fairs, using alternating least squares optimal scaling (ALSOS). However, the age coefficient was not significant at alpha 5% and was below an alpha of 10%. The latter result was not our accepted error rate.

Our first research question was: How do Swedish and Norwegian teachers use their autonomy to choose textbooks? The results suggest that Swedish and Norwegian teachers seem to follow partly the same criteria during deregulation as during the state approval system. The main difference is that in the state approval system, there was less consideration for the costs of textbooks. As mentioned in the introduction, many scholars feared that Swedish and Norwegian teachers in a deregulated system would only, or primarily, consider the costs of textbooks (Holmén, 2006; Johnsson Harrie, 2009; Långström, 1997). Our results indicate that this thinking was inaccurate, since Swedish and Norwegian teachers have themselves continued to report favouring content, readability and past experience under conditions of deregulation. In other words, teachers do exercise professional autonomy.

Our second research question was: To what extent do teachers' ranking of textbooks differ with respect to special educational qualifications, teaching experience and age group? We found that teachers' ratings of textbook choices differed in relation to all three variables. These findings support the idea that teachers, as a professional group, differ depending on the duration of their education and experience.

How can we explain the results regarding the function of experience and age? During their first years, teachers are very busy: they are seeking new methods, textbooks and curricular materials and strategies; they have to face professional challenges. At the same time, these teachers more often have young children, and taking care of them comes at the expense of free time devoted to reading current research. This is not the case with many older and more experienced teachers, whose children are more likely to have grown up and perhaps no longer live at home (Hargreaves & Fullan, 2013). Consequently, there may be more time remaining for research, studying the readability of textbooks and so on. Furthermore, more experienced teachers have learnt what works in the classroom. During reading practice, teachers become aware that pupils struggle with deficiencies in accuracy, quality and comprehension in relation to textbooks. Experienced teachers have gradually learnt to detect when a textbook requires prior knowledge that a pupil does not possess, and these teachers are also aware of the demotivating effect a textbook with a low degree of readability can engender. Experienced teachers also read what research has demonstrated regarding struggling readers (Reichenberg, 2016). This is further possible because they are likely to spend less time on lesson preparations than do less experienced teachers (Hargreaves & Fullan, 2013).

How can we explain the special education results? One explanation is that special educators gain more training during their education as a profession, compared to subject teachers , in helping pupils with learning disabilities – especially those with language, reading and writing difficulties. Special educators have also been exposed to research in reading and learning disabilities to a higher degree during their education than subject teachers. Their special education-oriented training

probably makes special educators even more interested in current research about language, reading and writing difficulties (Hausstätter & Takala, 2008). In other words, special educators have a professional responsibility of helping students in need guided by research. Consequently, their professional responsibility actually increases their ratings of research compared to subject teachers. In other words, special educators have a professional ethos of helping students in need, which increases their scientific propensity, compared to subject teachers (Brante, 2011).

These results may have policy implications. If teachers are more receptive to research later in their teaching career, then efforts to promote textbook research among them should not be confined to teacher education alone. Rather, efforts to promote textbook research needs to be accounted for at all stages of the teaching career.

Future research is needed on the relevance of school types – private and public – in teachers' choice of textbooks. Additional research is also needed into whether different subject and grade teachers' teaching experience will affect their choice of textbooks. Moreover, more research is needed to clarify the extent to which teacher characteristics such as sex, age, special educational qualifications and ethnicity predict textbook choice.

A final issue with the current state of research is the lack of trend and longitudinal studies. Although the studies by Reichenberg (2013, 2014) and the results of the current study suggest some stability in Swedish teachers' textbook choices, without access to data, we cannot assume that their choices have remained stable. Here, the need for either trend or longitudinal studies would advance the state of research.

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PART 2

MULTIPLE RESEARCH ACTIVITIES AND PRODUCTIONS

B. SCHOOL, SUBJECTS, TEACHING AND

LEARNING PROCESS

25 YEARS OF RESEARCH AND REFLECTION ON THE RELATION BETWEEN DIDACTIC MATERIALS AND ATTENTION TO DIVERSITY

Mª MONTSERRAT CASTRO-RODRÍGUEZ

The attention to diversity is a cross-cutting theme in IARTEM publications and is inherent to the association's very nature. The cultural pluralism deriving from the participation of researchers from all over the world exposes us to the wide range of conceptions regarding the role of educational materials and resources, typologies, formats, contents and the intended aims of educational systems throughout the planet. This diversity of point of views allows us to know each country, each educational system, each school responds to the different needs and characteristics of the students in the classroom: what curriculum, what kind of school, what kind of schooling, what professional, what materials and resources do they use? In special, in this paper we present the findings of a review of publications and congresses promoted by IARTEM to see what has been published over the last 25 years on educational materials used with students presenting functional disability/diversity or diversity in terms of sociocultural background, gender, religion, age, or other.

INTRODUCTION

The educational needs of each student may be conditioned by multiple factors such as age, personal experiences, family, social background, attitudes, aptitudes, potential, difficulties, tastes, and interests. Clearly, to respond adequately to all students in the interest of pursuing the utmost personal and social progress, it is essential to reflect and take measures on the design, planning and development of educational practice in schools. Consequently, this has a direct affect on the social conception, selection, adaptation and elaboration of materials in terms of their function, typology, and use. However, at the international level the demands of all students have not been adequately addressed in schools. Throughout history, part of the student body fulfilled a vision of what could be called "normal" children, and were distinguished from those who had characteristics considered to be unusual. For this latter group of students, who may present functional, social and cultural diversity, or may even be at risk for social and educational exclusion, proposals have been designed in parallel to the ordinary curriculum. The educational system has distanced these students from their peers by considering that they require special education and often focusing on their

disability instead of on their potential. The responses to this situation have been very different internationally. Some countries support the inclusion of all students in the classroom participating in the same educational project; in other countries, integrated systems are developed where all the students coexist and learn within the same school, but without common educational proposals; in a third model of attention to diversity, educational systems offer one curriculum for the general student body and another for people with disabilities or functional diversity in particular, therefore, leaving them out of common cohabitation. This complex reality is evident in publications regarding didactic materials and responses to student diversity, which reflect a variety of functionalities and uses depending on the methodological project being applied.

The resources and materials used in schools play a fundamental role, thus the concern of professionals and groups regarding the analysis, design, and planning of resources and educational materials that are implemented in the classroom. In this paper we present the findings of a review of publications and congresses promoted by IARTEM to see what has been published over the last 25 years on educational materials used with students presenting functional disability/diversity or diversity in terms of sociocultural background, gender, religion, age, or other.

IARTEM PUBLICATIONS

From our standpoint, IARTEM could best be defined by the multicultural character that it has nurtured over the 25 years of its existence. This is demonstrated both by the eJournal and in the rest of publications resulting from conference proceedings or monographs on educational materials and resources. Conducting meetings in different parts of the world gives us exposure to realities, points of view, as well as use and research practices that are often not reflected by congresses and journals. Because the aim of the association is research and reflection on materials and educational resources developed by professionals from every continent and almost a hundred countries, it has become an international reference on this subject.

The evaluation of didactic and curricular materials is a good opportunity to identify their characteristics, weaknesses and possibilities. In this way, professionals in the educational field will be able to select their materials according to the needs and characteristics of the circumstances. The involvement of researchers and education professionals from all over the world gives us a global view of existing research on resources and materials for attention to the diversity in the classroom. Our analysis focuses mainly on the eJournal, minute books and monographic publications by IARTEM.

a) Attention to diversity in the e-Journal

Attention to student diversity, especially those people and groups that have specific educational needs and characteristics, is a cross-cutting issue in e-Journal articles. Identifying the characteristics of materials when they are evaluated clarifies aspect such as content types, methodological proposals, the presence of human diversity, and the roles of different members of the educational community. In this way, it is possible to determine whether a material facilitates adaptation to students, regardless of personal characteristics, as proposed by Hansen & Gissel (2017). Dargusch, Persaud, Nayadin & Horsley, M. (2011), analyze the presence of student voices in Australian materials. Graf & Carlsen (2016) present the findings of a study regarding the extent to which materials contribute to the educational inclusion of all students. Castro-Rodríguez (2014) presents research on textbooks concluding that classroom proposals do not reflect a project that is inclusive of all students.

Our aim here was to identify publications that directly address materials that can be used by students with specific need for educational support. This field of research has been present since the first issue of the e-Journal where Hodkinson (2009) published an article analyzing the representation of disability and people with disability in primary school textbooks in the United Kingdom. This author (Hodkinson, 2014) later analyzed the representation of disability in digital and online materials.

Articles about research into the experiences of students with functional disability are not common. In fact, one of the only examples explicitly focusing on some kind of functional diversity was done by Keith, Sloas, Stacey, Mooney, Melody & Norris, Tracie. (2014), which presents research on materials used by students in a Physical Therapist Assistant (PTA) program.

More numerous are papers on sociocultural diversity, and the construction of social identities from an intercultural perspective. The research by Muhammad, Yaar & Brett (2015) focused on printed materials; Morgan, Kohler & Harbon (2011) analyzed textbooks and Mažeikien & Gerulaitien (2015) studied materials in digital formats. All of them point out invisibility and stereotypes resulting from the hegemony of certain cultures over others. In a similar sense, the visibility of social minorities in materials is key to understanding the societies in which we live, yet it seems that this is not being achieved according to the research by Rodríguez Rodríguez (2011), Knudsen (2012) and Senegacnik (2012). On occasion, materials and didactic resources become allies for the introduction of values and cultural contents promoting racist attitudes (Morgan, 2010). Esplugues (2017) analyzed the results of a study on materials prepared by Non-Governmental Organizations (NGOs) that are responsible for working on such issues as gender, the environment, interculturalism, human rights, and

sustainability. It was found that many of them "keep repeating the same hegemonic models" (p.75).

Migratory processes are a good opportunity for the construction of intercultural societies, and the visibility of cultural plurality in teaching materials is an opportunity to foster mutual knowledge, as stated in the publication by Norunn & Aamotsbakken (2010). Over the years there has been a concern about identity-related values and contents (Beauné, Bento & Riquois, 2015, Muhammad & Brett, 2015, Mažeikien & Gerulaitien, 2015) and how they are transmitted to people of other nations and backgrounds (Chalhoub, Hodkinson & Ververi, 2014, Lund, 2010, Raholiarisoa, 2009). The representation of gender in materials has been a permanent concern throughout the e-Journal's history. A multitude of perspectives have been put forth, ranging from the identification of women in the illustrations in materials (Knudsen, 2010), to the inclusion of content from a feminist perspective (Fahlgren & Johansson, 2010). In geographical terms, we observed a predominance of contributions from European countries and Australia, but there are few from Asia, America and Africa. Paradoxically, the latter are quite well-represented in the e-Journal.

b) A diversity of materials are included in proceedings, monographs and other publications

The publications stemming from conferences, regional meetings or monographs on specific topics also attest to the presence of reflections and research on educational resources and attention to students diversity, though cultural diversity predominates in most cases. The article by Reits & Wilkens (2011) is a good example of the commitment to materials quality in the learning process. It integrates criteria for the development of quality teaching and learning processes, including the fundamental axis of attention to diversity. In a similar sense, Graf (2015) discusses how materials can contribute to individualized learning, which takes into account the diversity of skills, interests, experiences, and so on.

Chapters regarding disabilities and educational resources have been published in Caught in the Web or Lost in theTextbook? (2008) where Ruškus & Pocevičienė present the results of a study on the contents and attitudes in Lithuanian textbooks on disability. In Peace, Democratisation and Reconciliation in Textbooks and Educational Media (2009), Castro-Rodríguez reflects on the characteristics, use patterns and suitability of textbooks with respect to the needs and potential of students requiring specific educational support. Local, National and Transnational Identities in Textbooks and Educational Media (2011) presents the results of research aiming to identify the characteristics of didactic resources and materials that are used in ordinary classrooms attended by students with special educational needs. Within this publication, the papers by Castro Rodríguez and Castro Rodríguez and the study by Teijeiro Bóo & García Murias focused on didactic materials and resources used in hospital classrooms. A contribution from

Brazil analyzed the use of media and learning tools in the construction of knowledge by blind people (Silveira Coden & Dias García, 2017).

Minority social groups are a recurring theme, both in terms of minority visibility and the requirements that materials should meet. The article by Knudsen (2008) refers to the theoretical principles underlying the publication Minority Cultures and Identities in Textbooks. Several articles involve indigenous cultures and the construction of knowledge. Moore (2013) identified the stereotypes and perceptions transmitted by textbooks; Bauer & Horsley (2013) analyzed the inclusion of indigenous cultures in textbooks and educational resources. Ferrarini & Gevaerd (2013) identified the concept of slavery transmitted in Brazilian primary school textbooks, as well as the invisibility of these contents and their stereotypical nature. A specific example of the invisibility of slavery was analyzed by Aparecido Chaves and Braga García (2013); namely, the absence of caipira music in Brazilian textbooks. Published as an outcome of the meeting held in Quèbec, the monograph entitled Representation of Minorities in Textbooks: International Comparative Perspectives (2016) includes 10 theoretical reflections and research findings drawn from every continent. Topics include the prevalence of some cultures over others in Quebec and in Norway, the presence of local sociocultural diversity in Brazil, aborigine culture in Australia, Apartheid in South African and other racist behaviors in Colombia together with the invisibility of migratory movements detected in Spain, as well as the way religious diversity is addressed in the materials published in Iran. All reflect the marginalization and stereotypical view that is transmitted both in textbooks and digital media.

Throughout history, migratory processes have fostered multiculturalism in all societies, although some societies have been more receptive to immigrants than others. One of the greatest challenges facing societies is the transformation of this multiculturalism, which consists of the cohabitation of different cultures in the same space, in order to promote spaces for cultural exchange, inter-culturality, acceptance of cultural differences, and sharing. Migrants have their own culture, which should be recognized and visible in the country they come to, just as they should get to know the culture of the receiving country. Even when this is possible, migratory perspectives are not always incorporated into school materials.

The recognition of the value of our culturally diverse societies represents an opportunity to promote the coexistence of all people, as well as contributing to the defense of the rights of social minority groups. Thus, we can see the relevance of analyzing the content transmitted by textbooks and other didactic materials regarding sociocultural diversity. The 11th International Conference on Textbooks & Educational Media held in Kaunas (Lithuania), was entitled Representation of Otherness, which highlighted the importance of how school materials represent other peoples, other cultures, and other societies. Oxfeldt (2013) analyzed how materials in Nordic countries have evolved to overcome oriental stereotypes.

Moore (2013) highlighted how indigenous students have often been presented as vulnerable and with special needs, which has contributed to an inequality of opportunity. Kaim-Kerth (2013) spoke of the polarization transmitted as a result of being or not being a Polish citizen. Bauer & Horsley (2013) highlighted the negative effects of transmitting stereotypes and negative conceptions of indigenous cultures during childhood. Balčiūnaitienė & Petkevičiūtė (2013) delve into the need to introduce sustainability values into the learning of languages as an essential element in the construction of knowledge of other societies, which coincides with Karayianni (2013). Norviliene & Zuzeviciute (2013) addressed this issue in the Lithuanian context. In addition to being addressed monographically at this meeting, this theme has been present throughout the 25 year history of IARTEM. Examples of this are the publications by Liiv (2002) in Estonia; Oxfeldt (2009) in Norway; Luiza de Souza and Marcos Dias Garcia (2015) regarding the influence of local culture on natural science textbooks in Brazil. Another recurrent theme is how the culture of one country can be transmitted to others (Lund, 2002) or the use of foreign language learning (Driessen, Haenen & Westhoff, 2002, Ravelonanahary & Clemons, 2011) as a mechanism for cultural transmission and promoting interculturality (Hager, 2002).

Religious diversity is also been discussed in publications. Breidlid & Nicolaisen (2002) researched religious values in Norwegian textbooks and, Opsal (2002) addressed the presence of Islam and Muslims in this same country. Another publication dealt with how language can become an instrument of relevance in religion (Askeland, 2011).

Although significant differences exist across borders, female culture is not equitably represented in the didactic materials of many countries and it may even be a worldwide trend. This theme is reflected in a number of articles, either in terms of female gender visibility or the values and stereotypes that are transmitted by didactic materials. This is apparent in contributions such as Ruskus & Gediminas (2002), Pnadey (2008), Bascuñán Cortés & Mora Luna (2011), Sánchez Bello (2011).

CONCLUSIONS

In general, it can be said that attention to diversity is a cross-cutting theme in IARTEM publications and is inherent to the association's very nature. The cultural pluralism deriving from the participation of researchers from all over the world exposes us to the wide range of conceptions regarding the role of educational materials and resources, typologies, formats, contents and the intended aims of educational systems throughout the planet. The contributions published in the e-Journal, the conference proceedings and monographs come from almost a hundred

countries. This diversity gives insight into the approaches that different societies and educational systems around the world have regarding attention to students with special educational needs. Overall, there is a tendency for educational resources and materials to respond to the needs of a heterogeneous classroom, where it is assumed that schools should be inclusive of all people. Nevertheless, we know that the educational systems in many countries are not truly committed to having children with and without disabilities learning together in the same classroom, as demonstrated by a number of studies promoted by international and supranational institutions (UNESCO, 2017). Consequently, articles have appeared in different publications in over 30 countries including key words such as "attention to diversity", "disability", "educational inclusion" and "materials" or referring specifically to materials and resources oriented toward groups of people with functional, sociocultural, gender, or religious diversity. In terms of the origin of studies addressing issues related to attention to diversity through educational inclusion, they are more numerous in European countries but very few studies have been carried out in America, Africa or Asia.

Insofar as future research, it would be very interesting to study how materials conceived for the attention to students with functional diversity are introduction into schools, and thus see which countries are truly making a commitment. We should continue forward in the process of disseminating the research results, reflections and practices in countries whose publications are not often available in context of IARTEM.

With respect to diversity, the bibliographic legacy of IARTEM is abundant, particularly in the field of sociocultural diversity and coexistence of different cultures within school spaces. These results, in contrast to those in SCOPUS and WOS (Web of Science) databases, reveal differences in terms of topic area and content, since publications regarding materials for people with functional diversity or other various kinds of disorder abound in the databases analyzed.

Both the publications in IARTEM and those in SCOPUS and WOS, reflect the coexistence of printed and digital formats, which often present similar characteristics, regardless of the type of media.

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RESEARCH ON NATURAL SCIENCES TEXTBOOKS IN BRAZIL

NILSON MARCOS DIAS GARCIA

This paper presents an overview of the research studies conducted on natural sciences textbooks (physics, chemistry, biology, and general sciences) by researchers from the Federal University of Paraná (UFPR) and the Federal University of Technology - Paraná (UTFPR) over the course of a decade. 2006 is the initial year of reference, as it marks the beginning of textbook distribution within the scope of the Brazilian National Program of Textbooks (PNLD). The following points can be highlighted as the main elements and goals of this investigation: the relationship between textbooks and teachers' formation; the study of contents and themes approached in textbooks; textbook selection criteria and usage strategies; the existence of, and role played by, digital resources in textbooks; the multiple and mutual influences exerted by local culture in textbook usage by teachers and students; and the marketing elements of textbooks. The results of this investigation – which have been presented in dissertations, theses, papers in journals and at scientific events – have shown a growing articulation of the researched themes, allowing for the recognition and establishment of increasingly complex relationships between studies regarding natural science textbooks and other elements.

THE ARRIVAL OF THE TEXTBOOK IN BRAZIL

The widespread presence of textbooks in Brazil would only be established some four centuries after the large-scale production of printed material began in the wake of the development of Guttenberg's printing press, which occurred at the beginning of the 15th century.

Even though European colonization of Brazil began in the 16th century, this long interval preceding the dissemination of books resulted from the nature of the colonization established by the Portuguese in the lands they had taken possession of in 1500. Through choosing mercantile exploration over settlement colonization (Bresser-Pereira 2015, 36), the colonizers did not aim to create an internal market of consumption, neither did they provide conditions for the development of education in their new territories. Symptomatically, printing houses were forbidden in the Brazilian colony at the time, with the aim of controlling the propagation of ideas that went against the Portuguese regime, thereby hindering the production and circulation of written material, including books.

One of the consequences of this form of colonization is reflected in the lack of concern for education in the new colony. Establishing a comparison with other colonies from the same time period, journalist Eustáquio Gomes indicates that

> The first universities outside of Europe were founded in the Spanish Americas. Historically, the University of Santo Domingo is the first university of the Americas, founded in 1538. After that, there was San Marcos, Peru (1551), Mexico (1553), Bogota (1662), Cuzco (1692), Havana (1728), and Santiago (1738). The first North American universities at Harvard, Yale, and Philadelphia emerged in 1636, 1701, and 1755, respectively. In the case of Brazil, although there had been isolated colleges since 1808, only in the 20th century did it have congruent, integrated universities capable of translating the "unity into universality" (Gomes 2002).

This delay in founding universities, and even colleges, together with the prohibition of printing press in Brazil, had a lack of textbooks in this period as its most immediate effect. The existing textbooks were imported from Europe, which restricted their use to only teachers and students, as most of the population was not literate.

This situation underwent a minor change when, following Napoleon's invasion of Portugal, the Portuguese court was moved from Lisbon to Rio de Janeiro in 1808. This resulted in the founding of the first colleges to attend to the needs of the Portuguese elite who had moved to Brazil, and also resulted in the beginnings of a publishing culture in the Brazilian colony. It was due to these circumstances, that the Brazilian market for textbooks first came into existence. According to Hallewell (2005, 237), the founding of the D. Pedro II School in Rio de Janeiro in 1837 can be considered the starting point for the history of the Brazilian textbook.

Despite this late introduction of textbooks into the Brazilian educational landscape, the initial setback began to be overcome through a concerted government effort in 1937, when Brazil launched a "program for the distribution of didactic volumes to students of the public education system". Describing the program, the National Education Development Fund of the Ministry of Education – FNDE[1] website states that "throughout the 80 years of its existence, the program has been refined, taking on different names and forms of implementation". Under its current title of National Program of Textbooks – PNLD, and in accordance with Article 1 of the 9.099 Decree of July 18th 2017, the program:

> as implemented by the Ministry of Education, is designated to evaluate and provide didactic, pedagogical and literary books, as well as other support materials for educational practices, in a systematic, regular and open manner, to the public schools at federal, state, and municipal basic education levels, as well as non-profit community,

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[1]   National Education Development Fund – FNDE. http://www.fnde.gov.br

faith-based, and philanthropic institutions agreed on in accordance with the Public Authorities (Brasil 2017).

With this focus on students and teachers of basic, elementary and high school, the PNLD became one of the largest programs for the assessment and distribution of textbooks in the world.

THE INCORPORATION OF PHYSICS TEXTBOOKS IN THE BRAZILIAN EDUCATIONAL LANDSCAPE

Similar to other textbooks, physics and general sciences textbooks only became present in Brazilian schools following the arrival of the Portuguese royal family in Brazil. While reviewing the official programs of the Pedro II School[2] courses in Rio de Janeiro, Lorenz (2008) verified that most of the textbooks were in French language or translated from French originals. According to the author,

> of the twenty-three science books indicated in the school programs between 1838 and 1889, nineteen were published in France and four in Brazil, and of the eighteen identified authors, fourteen were French and four were Brazilian (Lorenz 2008, 57).

This tendency of using French textbooks started to decline at the beginning of the 20th century, so that by the middle of that century almost all physics and general sciences textbooks were from national authors and editors, printed in Brazil, even while still containing a strong connection to the French teaching method. This influence almost disappeared over the course of the second half of the 20th century, when, due to many teaching projects being elaborated in the United States, a significant North American influence began to shape science education, a fact that also extended to textbook production.

The agreements between the Brazilian and United States governments, the so-called MEC-USAID[3] agreements, enabled a large amount of American volumes to be translated, supported the implementation of new Science Centers, and developed new projects at the time. This provided the grounds for a great surge in the national production of books, which started to develop its own conceptions and dynamics, stimulating the emergence of a diverse and economically representative publishing market.

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[2] The Pedro II School was founded on December 2nd, 1837, making it one of the most traditional public institutions of basic education in Brazil. For a long time, it served as a reference for the other teaching institutions in Brazil. Further information on its history can be accessed at http://www.cp2.g12.br/historia_cp2.htm

[3]   For more information on the MEC-USAID agreements visit http://www.histedbr.fe.unicamp.br/navegando/glossario/verb_c_mec-usaid%20.htm

Thus, physics and sciences textbooks were, for the most part, being written by Brazilian authors as well as produced by national publishers by the end of the 1970s. An important analysis of these books, produced between 1980 and 2000, was performed by Wagner Wuo (2000). Investigating a set of 24 books, this research verified that the textbooks were elaborated with the intention of attending to the specific diversities and contexts of the national education.

Within the scope of the PNLD, and beginning in 1996, sciences textbooks intended for students of the 5th to 9th years of elementary school[4] have been assessed, selected and distributed to all students and teachers of the Public School System[5]. Physics textbooks, intended for high school students[6], were evaluated and selected, only reaching students and teachers from 2009 onward.

BRAZILIAN RESEARCH ON PHYSICS AND SCIENCES TEXTBOOKS

According to Alain Choppin, textbooks have started to garner a great interest among researchers from various countries in the last thirty years following a long period of neglect by historians and bibliophiles (Choppin 2004, 549).

Choppin also drew attention to the fact that these research inquiries were almost certainly being prompted by the various functions that textbooks fulfil. For example, the referential function – according to which the textbook "constitutes a main platform for educational contents, acting as a knowledge, techniques and skills depository which a social group believes necessary to be transmitted to the new generations"; the instrumental function– when "the textbook puts the learning methods into practice"; the ideological and cultural – according to which "the textbook is affirmed as one of the essential vectors of the language, culture, and values of the ruling classes"; and the documental – when, "the textbook provides a set of documents, textual or iconic, the observation or confrontation of which enables the development of critical thinking in the students" (Choppin 2004, p. 553). These functions deeply affect school activities.

Within the Brazilian context, Tânia Braga Garcia (2017) points out that researchers began to focus on the fact that textbooks mainly appear in the school environment and classrooms. As a result, the role textbooks play in school life – as

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[4]   The Brazilian elementary school is organized in two stages: the initial and final grades. The students of initial grades (1st to 4th) are, on average, six to nine years old. The students of the final grades (5th to 9th) are ten to fourteen years old.

[5]   The Public School System includes federal schools, state schools and municipal schools. They encompass elementary schools: initial grades, around 95,000 schools; final grades: around 49,000 schools; high school: around 20,000 schools.

[6]   The Brazilian high school is organized in three grades. The students are, on average, 15 to 18 years old.

well as their interaction with teachers and students – became both interesting and necessary topics of research, besides those focusing solely on textbooks themselves as objects of study (Garcia, T. 2017).

As for the most recent tendencies, the traditional research on sciences textbooks used in elementary school and distributed within the scope of the PNLD for over three decades has rested mainly on the second approach, which focuses on the textbook as the object of inquiry. Thus, scientific publications presenting research focused on book contents have been recurrent, as well as research stressing the continuation of conceptual misunderstandings and other elements that can be verified by examining the contents. Only recently has there been an interest in the actual use of these books in the classroom.

The physics textbooks, on the other hand, were only incorporated into the PNLD a decade ago, entering Brazilian schools in 2009. Hence, the previous research focused primarily on books used in private schools. Though providing significant results, such as the study performed by Wuo (2000), most of the researchers' attention was focused on the organization of content and its conceptual accuracy.

This situation, however, has been changing, either due to educational reforms affecting elementary and high schools, or due to the growing pool of results from postgraduate programs whose focus or line of research have been issues regarding science education and its teaching. This has pushed the production of broader research in the fields of physics and sciences teaching[7], which has included studies regarding textbooks, analyzing the incorporation of new contents, as well as new ways of working with scientific knowledge.

In the present article, a special focus will be given to studies performed by the 'Culture, School and Teaching' research line connected to the Education Postgraduate Program – PPGE of the Federal University of Paraná – UFPR. The group has benefited from the participation of researchers from the Center of Research on Didactic Publications (NPPD-UFPR) and the Group for Studies and Research on Physics Teaching from the Federal University of Technology - Paraná (GE-PEF-UTFPR). This constellation stands out in the national research scene, having systematically and intentionally taken multiple aspects of physics and sciences textbooks as their scientific focus.

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[7] Among the diverse events in which the results of the research relating to physics and science teaching were presented and discussed, the National Symposium of Physics Teaching (SNEF) and the National Meeting for Research on Science Education (ENPEC) can be highlighted – both with over 1,000 participants and more than 500 papers presented –, as well as the National Meeting for Physics Teaching (EPEF), with around 200 participants presenting their work.

THE RESEARCH ON TEXTBOOKS UNDER THE PPGE OF UFPR

The 'Culture, School and Teaching' research line is a part of the Postgraduate Program in Education at the Federal University of Paraná – PPGE-UFPR, a highly respected postgraduate program in Brazil[8].

According to the PPGE-UFPR website, the 'Culture, School and Teaching' research line "focuses its study on the knowledge, culture and practices that are constructed and exhibited in everyday school life". These aspects are analyzed "in two dimensions: teachers' and students' thinking and practice, which means the formation of teachers and the craft/occupation of the student, considered in a historical, social, and daily perspective" (PPGE-UFPR)[9].

Also included within the scope of the PPGE-UFPR and linked to the 'Culture, School and Teaching' research line are the 'Didactic, School Practices and Didactic Publications' research group (created in 2001), and the so-called 'Research Group for Didactic Publications' (NPPD-UFPR) – both under the supervision of Professor Tânia Maria F. Braga Garcia. As described on its website[10], the NPPD was created in 2002 with "didactic manuals and other publications aimed at schools, teachers and students as its object of research", constituting an overarching theme for their activities.

Originally focused on history textbooks, the activities of the 'Didactic, School Practices and Didactic Publications' research group and the NPPD eventually led to research on textbooks of several other subjects, centered mainly on themes linked to the selection and usage of textbooks by students and teachers in their diverse learning environments.

One of the research strands at the NPPD which has grown in scope is the research focused on the diverse aspects concerning physics and sciences textbooks, especially after I started my activities in the UFPR's Postgraduate Program in Education in 2002, as well as my participation in the NPPD. Although having originally developed my teaching and research activities in the Federal University of Technology - Paraná – UTFPR, the activities of the Research and Studies Group

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[8] In Brazil, the postgraduate programs are evaluated every quarter by the Commission for the Improvement of Higher Education Personnel – Capes, the agency of the Ministry of Education responsible for the recognition and evaluation of *stricto-sensu* postgraduate courses at a national level. In accordance with the Capes evaluation, the PPGE-UFPR was recently evaluated as Grade 6, with Grade 7 being the highest possible grade. The evaluation criteria can be found at http://capes.gov.br/avaliacao/sobre-a-avaliacao.

[9] Further information on the Culture, School and Teaching line of research can be found at http://www.ppge.ufpr.br/cee.htm.

[10] The NPPD website can be accessed at http://www.nppd.ufpr.br

on Physics Teaching– GEPEF, which I coordinate, started to couple with the activities of the NPPD. This resulted in a significant amount of research performed by research assistants, undergrad, Masters and PhD students, especially since 2007, which had the complex relationships between physics and general sciences textbooks and several school agents as its object of study.

These research studies have been developed mainly within the school environment, giving a voice to students and teachers who interact with the textbooks. These studies have been centered on issues related to the selection of textbooks, their use by teachers and students, while not neglecting the specific aspects of the market and their role within school culture.

The research has been presented at events in the field of physics and sciences teaching or published in journals and were categorized according to the most evident tendencies in each study. The foci can be illustrated as follows:

— The textbook as a cultural product and as merchandise;

— The relationship between school manuals and the process of teachers' formation;

— Research on the specific contents and themes of textbooks;

— Processes of textbook analysis, selection and usage;

— School manuals and digital resources;

— Review studies.

THE TEXTBOOK AS A CULTURAL PRODUCT AND AS MERCHANDISE

The research performed on this topic has focused on textbook distribution policies in Brazil and the analysis of the relationships that may be established through a comprehensive understanding of the processes of evaluation, production and distribution of textbooks.

This research interest has been justified by the relevance that the National Program for Textbooks – PNLD has acquired within the educational context and the publishing market in Brazil.

Within a broader spectrum, a first aspect to be considered is the establishment and application of the evaluation criteria which allow this product of school culture to be, at least theoretically, accessible to all students and teachers of Brazilian public schools.

Oriented along criteria established in notices, the books submitted to the PNLD have been evaluated by researcher-teachers linked to the universities, as well as by elementary education teachers. After this process, the recommended

books have to be chosen and sent to all the public school teachers and students in the country, which, according to Garcia and Garcia (2017),

> not only presents a problem in terms of financial resources, but also of a logistic and operational nature, as well as pedagogical and didactic. This not only creates challenges for the federal government, but also for publishers, authors, evaluators, and, finally, schools, teachers and students (Garcia & Garcia 2017).

According to the authors cited above, research investigating what happens when the books reach schools and their teachers and students is of great importance, because:

> being one of the main resources used by teachers, this cultural artifact is, according to Apple (1995, p. 81), what defines a "great part of the material conditions for teaching and learning inside classrooms in many countries throughout the world". Simultaneously, it is the texts from these books that often define what is to be considered the legitimate culture to be transmitted in schools (Garcia & Garcia 2017).

Meanwhile, given the size of the program, both in the volume of financial resources and the number of distributed books, it must be seen to assume a significant role for publishers, many of whom secure most of their revenue from the approval of their books through the PNLD. This means that, besides the focus on textbooks as artifacts of school culture and as cultural products, research has moved to analyze the impact and nature of the textbook as merchandise as well.

To that end, these investigations have used "studies related to cultural production as their theoretical support (Adorno & Horkheimer 1991; Williams 2000; Bourdieu 2009), as well as studies contributing to the understanding of the marketing dimensions of textbooks (Apple 1995; Marx 2010; Munakata 2012)". The research takes "certain aspects of the relationship between textbooks and a broader social structure," into account, with the consideration "that more than simple elements of school culture, textbooks may also be understood as cultural products and merchandise" (Martins & Garcia 2017).

When analyzing these aspects of textbook production, researchers have concluded that they also represent merchandise, a commodity which, "within a macroeconomy analysis, only occurs when textbooks are commercialized and allocated to teachers and students, thereby being assessed for their use-value and not for the exchange-value inherent in their role as assisting in the teaching-learning process" (Apple 1995, apud Garcia T. 2017).

THE RELATIONSHIP BETWEEN SCHOOL MANUALS AND THE TEACHERS' FORMATION PROCESS

Investigating the relationship established between school manuals and textbooks and the teacher formation process helps highlight how these books affect the

methods of teaching physics and sciences, how they act as guiding manuals for teachers, or their role as books destined for students. Presented as a specific, individual article, or inserted as a booklet in textbooks, guiding manuals feature proposals for teachers on how to develop their activities in class and may play a significant role in teachers' initial education, but are mostly present in the continuing teachers' education, in which the individuals are already professionally involved.

Thus,

> [The] main perspective in the performed investigation is to outline an approach and understanding of the relationship which teachers establish with textbooks and, in this particular case, with physics textbooks. Conceptually, this investigation uses the foundations of critical realism as its basis (Bhaskar, 1975) and aims at comprehending the dynamics within the school space based on the concepts of everyday life (Heller, 2002) and social experience (Dubet and Martucelli, 1998). In the selected perspective, which emphasizes the sociological and anthropological dimensions of the didactic experience, the main understanding is that it is both possible and necessary to study the space where teachers produce their work with the express intention of understanding the constitution of processes through which the manuals become instruments or practical guidelines during classes (Feitag, Costa and Motta 1993) (Garcia T. & Garcial N. & Pivovar 2017).

The research focuses its premise on an investigative methodological approach within the school space itself and a concern in listening, registering and analyzing situations based on teachers' and students' perspectives, as well as trying to answer and better interpret these issues. Many studies involving the subjects of physics and sciences have been developed approaching, among other topics, the relationship that teachers establish with the methodological orientation inside the manuals; the didactics present in the teaching of teachers' manuals; the roles played by the textbook; its presence in the initial teachers formation; and the influence textbooks have in teacher's planning.

According to T. Garcia (2017), the results of these investigations have in general indicated that, despite a reasonable efficiency concerning textbook distribution to teachers and students, they are often not used much in the classroom, not even as a supportive element for homework activities. Its largest use has been as a support for performing exercises or reading on a few complementary topics.

In accordance with Leite and Garcia (2017), it has also been shown that not all student teachers have access to discussions regarding the specificities of textbooks during their initial formation. Approximately 70% of the survey participants "stated that the information received from student teachers about textbooks is not sufficient" for them to properly "assess, select and use the textbooks provided by government programs with assurance" (p. 136). Another conclusion is that, because textbooks have been present throughout the student's entire life, including their teacher formation process, textbooks as a formed entity are unnoticed, and

are not understood as an object of study which would allow for a better use of their potential as a constant element in school culture.

On the other hand, research developed by Aguiar and Garcia (2017) showed that physics and sciences textbooks have been a great influence on the curriculum and teachers' planning, even though they are generally not the object of critical studies during teachers' formation.

Employing a different focus, the possible relationships between the elaboration of the most used physics textbooks in undergraduate courses – especially in teachers' formation courses – and elements present in textbooks aimed at high school students and teachers was investigated. In that context, research verified that it is possible to identify an influence of undergraduate textbooks on high school textbooks, both in formal aspects and in content, which justifies the fact that high school textbooks tend to be more traditional in these aspects.

RESEARCH ON THE SPECIFIC CONTENTS AND THEMES OF TEXTBOOKS

With a major focus being placed on the subjects of physics and general sciences, some of the performed research aimed at analyzing aspects covered in physics and sciences textbooks approved by the PNLD. Within this context, Pampu and Garcia (2017) investigated the meaning that introductory texts can provide to the contents of Dynamics in physics textbooks for high schools. Canhete and Garcia (2017) analyzed innovations which can be introduced in sciences textbooks, and Carvalho and Garcia (2017) investigated the influence that books for higher education exert on the production of those books intended for high school.

Some of the specific knowledge fields that served as a basis for the development of research involve contents concerning electromagnetic induction, electric field, dynamics, modern physics and thermodynamics.

As for the school knowledge, the investigation led by Carvalho and Garcia (2017) has shown that the didactic transposition applied to these contents often results in a variety of simplifications of concepts present in undergraduate textbooks, exposing the influence that these books exert on high school textbooks.

History of science has also been approached using the textbook selection process of the PNLD as a reference, verifying that most of the evaluators do not have the formation, nor the specific academic production required to evaluate the books. This fact may be a contributing factor to the tendency of history of science to move towards a process of simplification – especially in physics textbooks – that not only inhibits a more elaborated comprehension of scientific production, but also produces a conception within the textbooks that breaks down to a "caricature of scientific history" (Zanetic 1989).

Regarding the language used in the analyzed books, the research indicated that it "maintains the traditional way of approaching physics in school education. That is with descriptive texts and few possibilities for interaction with the reader", as well as "elements which indicate an understanding that authors do not possess the entirety of knowledge, and that readers are more than passive receptors of predefined meanings" (Pampu & Garcia 2017).

PROCESSES OF TEXTBOOK ANALYSIS, SELECTION AND USAGE

In this research, as in the others studies, both teachers and students strongly expressed their opinions in regard to the processes through which physics and sciences textbooks are evaluated within the scope of the PNLD, how they are distributed to schools, and the way they are used – both in classrooms and in other educational environments. Other intervening factors, such as those originating from the community in which the school is embedded, were also analyzed, and incorporated to those originated from the schools themselves.

The motivation for these concerns is supported by the empirical evidence showing that

> ...from the educational research perspective, it is possible to confirm a lack of knowledge regarding the usage of textbooks in classroom, and not only in Brazil. As shown through evaluative works performed by researchers from international groups looking into the subject (Valls Montés, 2001; Reiris, 2005; Garcia, 2007), the textbook as an object is still studied more than the use that teachers and students make of it (Garcia & Silva 2017).

This concern regarding the physics textbooks in particular had already been latent since the announcement that physics books would also be distributed to students, but gained strength after they effectively arrived in schools in 2009, following the PNLD assessment process. An integral question that instigated this research can be summarized as: "What happens now that physics textbooks are in schools and in the hands of teachers and students?"

Results of investigations on the matter have offered a few clues as to how physics textbooks are being used by students and teachers as an effect of their presence in schools. One such clue, of a more practical nature, indicates that its use has not been that intensive, many times due to the book's weight and the fact that students must carry them around[11]. Another clue, of a methodological nature,

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[11] In this case, it should be noted that students must carry the books in their backpacks from home to school because most of the schools do not have lockers where the students can store their books between classes. Another aspect is that students have, on average, three to five different subjects per day. Considering that each book has an average weight of one kilogram, the effort that students must expend to carry all the books that they may need in a day, without the guarantee that they will be actually be used, is very large and discouraging.

"indicates the permanence in school culture of the didactic models in which the teacher leads the path to knowledge, often waiving the use of the book" (Silva & Garcia & Garcia 2017).

Researchers were able to observe that the textbook's presence in classrooms was being acknowledged in a similar fashion to that of a pedagogical resource, as something similar to television or a chalkboard, and were not integrated into overarching projects where they could be put to use within the scope of a more wide-ranging plan. The use of textbooks is focused on their role as a repository for exercises to be solved in the classroom, or for homework, which can be taken as a sign of this understanding. This disconnection might be one of the reasons for the students' lack of interest in the books.

This concern with the selection of textbooks was later extended to general sciences books, an elementary school subject which includes physics concepts in its content. As this subject is fundamentally taught by teachers who do not have an in-depth formation in physics, some of the observations indicate that:

> In teaching contents that the teacher does not fully understand, such as physics, the book does not offer contributions to learning, as it focuses on calculations and has little to offer in terms of interdisciplinarity and contextualization of content. The textbook is used as a source of information, a repository for support and research material for students and teachers. Nowadays, it shares a space with multimedia TV, DVDs, videos, the internet and computers in the preparation and execution of lessons (Baganha & Garcia 2017).

Another topic related to general science textbooks developed in the research aimed at identifying elements of the local culture where the school is located which may influence the choice and use of textbooks. One study aimed at "verifying how aspects of local culture can interfere in the pedagogical practice of sciences teachers and how this is reflected in the choice and use of textbooks" – performing its research "with elementary school teachers of the 5th grade from three schools, one in the countryside, one in an indigenous reservation, and another in an urban area, and based on Ezpeleta and Rockwell's (1989) theoretical assumptions concerning the school's social construction". This study was able "to verify that the teachers adapted the book to their realities. Specifically, in sciences education and in connection with the curricular plan, the contents are adapted according to the student's reality". The same can be said of the criteria for choosing the books (Souza & Garcia 2017).

Other studies were performed with the aim of elaborating an instrument to assist teachers in the process of textbook selection. The demand for such a tool seemed necessary, as teachers need to choose from a wide range of books approved by the PNLD in a relatively short period of time. Given the responsibility of this undertaking and the additional workload that comes with it, it should be noted that the choice is often made using criteria that do not necessarily take into

consideration which characteristics of the book can best contribute to the specific teaching-learning process.

In general, the investigation indicated that there are several difficulties in teachers' selection process for physics and general sciences textbooks. Multifaceted justifications have been given by the teachers as causes for the difficulties, as well possible adequate solutions for this situation.

SCHOOL MANUALS AND DIGITAL RESOURCES

The focus on how information and communication technologies (ICT) are featured in students' activities first appeared as an object of investigation within the PPGE's 'Culture, School and Teaching' line of research in 2006 – in the same year a dissertation aimed at "investigating the insertion of new elements, such as hypermedia, in the educational environment, with a focus on their possible contribution to the teaching-learning process" was defended (Artuso 2017).

There has since been a growing presence of these elements in physics and sciences textbooks, especially from the time they began to be evaluated and distributed by the PNLD. In 2015, following the incorporation of textbooks approved by the 2015 PNLD concerning software and digital learning objects (DLO), there was a rise in research aimed at investigating how ICTs were being incorporated into textbooks approved by the program.

In view of the effects of the growing presence of these elements in the PNLD textbooks, it was therefore possible to analyze how, and to what extent, ICTs have been incorporated in the books using a book approved in three successive PNLD as reference (2009, 2012 and 2015). This "enabled the verification of a clear increase in the number of information and communication technological elements taking place during these years" (Barbosa 2017).

In line with this approach, other research studies were developed aiming at verifying the quality of access, reliability and usability of the DLOs, especially those with open access, as these are the elements present in textbooks distributed to all public school teachers and students (the disclosure of links and software or proprietary applications would not make sense as it would hinder the access for most of the books users). The studies showed that access to the apps available in the textbooks is not always easy – in some cases, many of the apps became inaccessible in a relatively short period of time, due to discontinuation of the hosting website itself or the platform on which they were developed.

This research showed that, even though there are a variety of problems in accessing the DLOs, they still play an important role in complementing the printed textbooks.

In the same line of investigation, but aimed at the materials used by teachers and students, other studies have been performed supported by the Brazilian law that establishes that "every person with a disability has the right to equal opportunities as other citizens and shall not suffer any kind of discrimination" (Brazil 2015). These studies have investigated the "differences in methodology, resources and tools that teachers use for students with visual disabilities to ensure they have full access to the contents of the subjects developed in regular education" (Coden & Garcia 2017).

These research studies have been performed using practices developed by professionals working with blind students in a "multifunctional resource room"[12] and have "enabled the identification of materials, procedures and strategies that help students follow their classes in regular schools in a more satisfactory way" (Coden & Garcia 2017).

Overall, the analysis of the incorporation of these new technologies in everyday school life, the theoretical framework in which they are elaborated, the relationships established with other materials, as well as the meanings that this incorporation can have in the teaching-learning process, highlight the elements which challenge and fuel the present research about textbooks.

REVIEW STUDIES

The studies focused on textbooks allow for a positioning of research within the national and international investigative context, a goal which the research group has also set for itself.

Hence, the review studies play a fundamental role in the development of new research and the deepening of ongoing research. This is a central issue for the NPPD and GEPEF research groups, where one such study can help illuminate a way forward in the search for answers to new or established questions, as well as revealing the state of knowledge production on a theme at a given moment.

In the national research framework, the research production based on the review of papers presented at the most significant events in the field of physics and sciences teaching in Brazil has been an object of analysis, focusing on events such as the National Symposium of Physics Teaching, the Meeting for Research in Physics Education and the National Meeting on Research on Sciences Education.

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[12]   Created by a Brazilian government program, the Multifunctional Resource Rooms are environments set up with equipment, furniture, didactic and pedagogical materials with the goal of a specialized, high-quality educational service, aimed at attending the needs of students with disabilities, global development delay and the intellectually gifted who are enrolled in regular classes within the regular education system.

In the course of research conducted about the review of papers presented at these events, Leite, Garcia and Rocha (2017, 512) observed that "from 2004 onwards, the trend in investigations about the multiple aspects related to textbooks stopped being almost exclusively focused on the analysis of contents and began to also include the study of research focused on language and methodology". At the same time, the researchers verified that "research considered of high importance, such as studies investigating the relationship established between school subjects and textbooks, as well as studies discussing public policies, have not yet received the deserved attention from the investigators" (513), being only presented in smaller numbers at the analyzed events.

Another strand of investigation explored by the group is focused on the analysis of pedagogical and methodological conceptions that have influenced authorship and production of Brazilian textbooks in physics and general sciences. Using the categorization of pedagogical conceptions and tendencies as a reference, the studies performed by Martins and Garcia (2017a) have indicated a predominance of conservative characteristics in the most recently produced physics and general sciences textbooks, as well as a standardization in both graphical and content-related aspects.

According to these authors, these studies are of great relevance as they allow for an "important foundation for the reflection on the history of the constitution of this specific school subject" and "contribute to the investigation regarding the frameworks adopted by the curricular organization of this subject in face of its insertion into school culture" (Martins & Garcia 2017a, 544).

FINAL CONSIDERATIONS

In presenting the set of texts that, in effect, represent a decades-worth of research production, and which were recently grouped together in the publication "The physics and sciences textbook in focus: Ten years of research" (Garcia, org. 2017), our attempt is to illustrate the efforts of the research group to draw out and highlight the relationship between the textbook and elements of society and culture, using the activities developed in school as their reference.

This effort acquires more meaning because, over time, the textbook has been seen to play an important role in the school space as, in accordance with Choppin (2004), a "main support of educational content, a depository of knowledge, skills or abilities that a social group believes necessary for the new generations" (p. 553).

In this sense, the research corroborates results presented by Garcia (2011), when stating that "various dimensions of the school experience are affected by the presence of books in the classrooms: including, among other things, teaching methods, assessment, the image of teachers, and knowledge" (Garcia 2017,

p. 515). It thereby reinforces the importance of policies, practices and training of teachers to fully consider and include proposals for the discussion of topics addressing textbooks within the scope of their diverse and complex relationship with the school environment.

This effort is particularly pertinent in the current scenario in Brazil, in which the educational system is being stimulated to expand courses for physics teachers' formation in an attempt to suppress a shortage of professionals available to teach the subject in basic schools; the high school system is undergoing a restructuration which will leave uncertainties open regarding the roles which the school subjects will play in the formation of students and in the performance of teachers; and in a moment when the publication of the National Common Curricular Basis is imminent, which will propose a reorganization of the school subjects and how the minimum knowledge that students must have access to should be composed.

All these issues certainly will, in the medium term, influence many public policies which will themselves demand the attention of research on topics related to teaching, as well as school textbooks and other published materials composing school culture. This approach highlights the complexity of this object of study, as shown by several authors, suggesting further potentialities in this still promising and intriguing field of investigation, as well as offering motivation for its continuous development.

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RESEARCH ON PRIMARY SCHOOL NATURAL SCIENCES TEXTBOOKS IN PORTUGAL

FERNANDO GUIMARÃES

The main aim of this research paper is to understand the place given to Botany in Natural Science textbooks used in Primary School Education in the last century in Portugal. In order to interpret the shifts in the content approach for Botany, didactical books at this educational were studied based on eleven principles: Form, Kingdoms, Classification, Organs, Roots, Stem, Leaf, Flower, Fruit, Reproduction and Dimensions. This study used a qualitative methodological approach supported by a content analysis and the establishment of *a posteriori* categories, as well as a *cluster* analysis through the construction of dendograms. The latter constructions were intended to promote the comparison of first hand sources – textbooks – taking into account the pedagogical and didactical orientations, the educational and curricular policy recommendations as well as the educational and scientific values suggested. Data analysis shows that changes have occurred in the terms used for the teaching of Natural Sciences and in the contents approached, which have taken on different relevance over time. Therefore, one may find the conservation of various botanical contents distributed throughout different botanic dimensions; namely, the notional dimension, the morphological dimension, the functional dimension and the ecological dimension.

INTRODUCTION

With the development of different perspectives regarding the scientific knowledge of biological classifications (i.e., botany and systematics, including nomenclature and classification, history of several classification systems, and taxonomic schools, as well as Kingdoms of living beings), a number of authors report that many gaps arose in the Portuguese teaching system. Throughout the last century, various governments have attempted to correct existing weaknesses by introducing new Botany contents into the curriculum for Natural Sciences at the compulsory basic education level (Guimarães & Santos 2011).

The teaching of botany gradually became more complex along with curricular and didactic changes that accentuated dimensional metamorphoses. Changes regarding the curricular area to be studied are reflected in Portuguese legislation, from the so-called Natural Sciences, Geographical-Natural Sciences, Physical and Social Environment to Environmental Studies: Decree of October 18th, published in the Official Government Gazette of October 20th, 1902, approving the list of

subjects that make up Primary School; Decree No. 7.311 of February 15th, 1921, published in the Official Government Gazette, approving the General Primary Education curriculum annexed to the same decree; Decree No. 16.730 of April 13th, 1929, published in the Official Government Gazette, approving the new Elementary Primary Education curriculum; Decree-Law No. 42.994 of May 28th, 1960, published in the Official Government Gazette, which updates the Primary Education curriculum to be adopted in subsequent school years; and, finally, Law No. 46/86 of October 14th, 1986, published in the Official Government Gazette, registering the Basic Law of the Educational System.

The focus of our analysis is the complex reality of Botany teaching in Portugal, a knowledge area affected by the process of reorganization as well as by Portugal's historical and educational circumstances. This knowledge area is undergoing important changes, is faced with new challenges as a result of significant environmental and political alterations, new practices, and a curricular debate that has been felt in diverse national and international forums. Therefore, we adopt an interpretative and critical perspective of educational processes, emphasising documentary research on the representations of the study objects: school textbooks.

School textbooks are truly important to schools in shaping forms and contents of pedagogical knowledge, and integrating the sequence and rhythm of their transmission through, for example, the activities and evaluations they propose; in other words, they play an important pedagogical and didactic function (Molina 1987, Fracalanza & Megid-Neto 2003). From this perspective, textbooks can provide knowledge of underlying pedagogical and curricular ideology, teaching and learning processes in the classroom, and the roles of students and teachers.

The focus of our research is one of the most characteristic domains of the primary school subject called "Study of the Environment", i.e., Botany. In fact, by analysing curricular texts and textbooks, we can see that both theory and practice of Natural Science teaching places Botany as its fundamental structuring component. It is one of the subjects that traditionally define the discipline most consistently and systematically.

The current paper focuses on the teaching of Natural Sciences, mainly Botany, from the perspective of school textbooks, using a diachronic approach and based on a set of assumptions: throughout the 20th century, the teaching of Natural Sciences underwent an evolution in structure, contents and pedagogical methods; even today teaching is influenced by concepts such as the so-called Lessons of Things (Melcón Beltrán 2000, Gómez Rodríguez, Somoza Rodríguez & Badanelli Rubio 2003); changes have been more or less marked by the evolution of Science as well as by new approaches in Educational Sciences (particularly Pedagogy and Didactics); textbooks are important tools in the development of teachers' professional practice (Tormenta 1996); textbooks reveal the way Natural Sciences have

been approached in primary education since the beginning of the 20th century. Thus, they constitute a relevant documentary corpus for the analysis of contents, pedagogical methods implemented by teachers, educational policies, educational reforms, and curricular changes. The analysis of school textbooks makes it possible to deconstruct the teaching of Natural Sciences and reconstruct the teaching of Botany, which has been the king of Natural Sciences (Guimarães 2010).

METHODOLOGY

Our sample consisted of 194 Natural Sciences textbooks published from 1900 to 2000. We found that these fell into four main groups according to their denomination. There were textbooks for Natural Sciences, Geographical-Natural Sciences, Physical and Social Sciences, and Environmental Studies. These textbooks mostly contained information on authors' names, edition numbers, publishers, official approval, harmony with programs, level of education, and classes/years of schooling. We came across a problem regarding publication dates, as most of our sample did not include it. We also verified the existence of botany contents in different textbooks.

The corpus of pedagogical texts upon which our study was carried out comprised Primary level, Natural Sciences school textbooks. Textbook selection was carried out from the sampling universe targeting Elementary School levels. A sample of 25 books (published from 1903 to 1998) was considered for analysis; textbooks were excluded if they did not mention official approval, were not in line with the adopted programs, and did not include publication dates.

Data analysis became an essential issue in this research, as it was important to find evidence that would make it possible to describe and interpret the situation based on reality features. Given the analysis framework, assumptions, objectives, and object of study of our research, it was necessary to gather information from the textbooks to elaborate suitable instruments for analysis and treatment. A set of tools was used to achieve the mentioned objectives: i) content analysis, which essentially consists of a systematization effort, attempts to make contents fully analysable and involves relatively complex procedures. The analysis is split into various phases that encompass the determination of category and analysis units (Bardin 1988) so that different features on Botany in Primary school textbooks are gathered; and, ii) *cluster* analysis is used as an exploratory tool for data analysis and classification problem solving. It is also known as taxonomic analysis and attempts to identify homogeneous case groups within a given population, i.e. it aims to identify a set of groups in which intravariations are minimized and inter-variations and maximized. There is a relationship between case similarity and distances on graphic representations in such analysis. For instance, similar cases share a high level of similarity in dendrograms (Maroco 2003).

SCHOOL KNOWLEDGE, CURRICULA AND TEXTBOOKS

Investigating school knowledge and analysing textbooks reveals that the existence of Botany contents within Science teaching cannot be understood (over the last century in Portugal) without considering the nature of educational and curricular policies, as well as teaching-learning processes. School knowledge sets are marked with various relationships established with agents from multiple possibilities of interests, emphases, transmission ways, complexity of analyses, and articulation of contents and practice of school textbook usage (Santos 2000). Such knowledge is found in school curricula, built by the development of learning paths foreseen in normative proposals; moreover, learning of more tacit sets of rules, values, and practices immersed within school cultures is also involved (Lacasa 1994).

School textbooks are important pedagogical, cultural and ideological tools that contribute to the transmission and consolidation of skills, thus assuming a crucial role in terms of contents and working methods. A complex analysis of textbooks can contribute significant information for characterizing school knowledge, Botany teaching in Portugal, and its educational processes. The idea that textbooks play a decisive role in the transmission of scientific knowledge has been put forward in recent times. According to Morgado (2004, 25) textbooks "have been playing an important role in organizing and delivering teaching-learning processes, being able to survive different educational and curricular policies, in very different cultural contexts". Given that there is a dominant approach at each moment, textbooks may reflect the approach that conditions activity ad affects the image of the scientific area presented to society. The study of school textbooks is a way of understanding a certain time period and characterizing policies and educational models, because textbooks are objects of culture and they represent and contain "cultural options more or less explicit, more or less assumed and as such, value and prescribe as truth and as knowledge certain kinds of knowledge, but silence, neglect, and marginalize many other kinds of knowledge" (Magalhães 1999, 285).

According to this perspective, textbooks hold a criterion of truth, since it is interpreted as being the truth, even though they conceal other kinds of knowledge considered uncomfortable or less relevant for the development of science in a particular socio-educational context. An extraordinarily fruitful field of inquiry is, in our view, the way we look at textbooks about cultural representations - scientific, material, axiological and know-how - as well as about the visions of the world and educational goals that structure them. By doing so, textbooks can be analysed not only from a cultural perspective, but also in terms of pedagogical and didactic views (Guimarães 2015).

School textbook history may be understood by considering three major directions to which distinct disciplinary perspectives correspond. One of the more recent

research lines involves the internal history of education. This analysis field, which studies the interior of educational institutions seeking to find the meaning of activities that occur within them, essentially favours curriculum history (Magalhães 1999, 279). An approach to curriculum history involves the study of tools with which a national curriculum is settled at a certain given historical moment. These tools include study plans, programs, tests, and textbooks. This study is extremely relevant in order to reconstruct curriculum history, because the whole textbook is historically and geographically defined, being the product of a social group and a specific period of time (Sacristán 2000). In this paper, we have taken school textbooks as differentiated didactic and pedagogical sources to structure school cultures "whose production corresponds to a complex configuration involving text, shape and speech, [being] a combination of knowledge/ skills/ (in)formation" (Magalhães 2006, 6).

RESULTS

As can be seen in Figure 1, the first *cluster* shows the Shape features in textbooks from 1900 to 1920; the second *cluster* shows particularities of Shape in textbooks from 1920 to 1940; the third *cluster* shows the Shape features from 1940 to 1980; the fourth *cluster* shows singularities of Shape in textbooks from 1980 to 1990; and, finally, the fifth *cluster* shows the Shape features in textbooks from 1990 to 2000.

We should not forget the particular cases found in the textbook from 1925 (first *cluster*), and in textbooks from 1989 and 1990 (with position change in *clusters* four and five).

Our analyses suggest relationships which result from similarities among textbooks. We found, by considering our analysis matrix, that textbooks published in the first two decades of the 20th century in Portugal are similar in Shape, thus presenting the same name ("Sciências Naturais", i.e. Natural Sciences); they belong to the Primary level; teaching was split into classes; texts had no images, except the 1910 textbook, in which images are found at the bottom side of the text; and, didactic activities that promote memorization and questionnaires and summaries.

The textbooks of the following decade are similar in Shape, mostly presenting the denomination "Sciências Naturais" (Natural Sciences), although, in 1933, a textbook entitled "Ciências Naturais" (Natural Sciences) was published; they belong to the Primary level; teaching was split into classes; images took up a smaller area than the text; no didactic activities were proposed. Textbooks from the 40s, 50s, 60s and 70s (20th century) in Portugal are similar in Shape, although different names are found, such as "Ciências Naturais" (Natural Sciences) and "Ciências Geográfico-Naturais" (Natural-Geographical Sciences); they belong to the Primary level; teaching was split into classes; coloured images are found, covering the same area as the text; didactic activities aim at memorization and experimentation.

Textbooks from the 80s (20th century) are similar in Shape, and are named "Meio Físico e Social" (Social and Physical Environment); teaching was split into school years; coloured images are found, covering the same area as the text (in the 1989 textbook, images are bigger than the text); didactic activities aim at memorization, experimentation, research, banner production, and herbarium build-up.

The 90s textbooks (20th century) in Portugal are similar in Shape, and are named "Estudo do Meio" (Environment Study); they belong to the Basic level; teaching was split into school years; images are bigger than the text; didactic activities aim at memorization, experimentation, research, banner production, herbarium build-up, and group and field work.
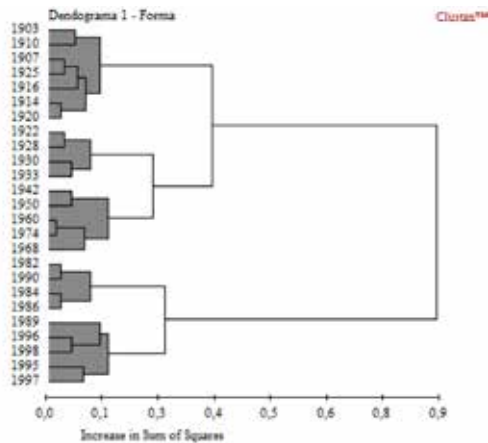
Figure 1 – Dendrogram Shape.

As can be seen in Figure 2, the first *cluster* shows the Dimensions features in textbooks from 1900 to 1920, and from 1925 to 1990; the second *cluster* shows particularities of Dimensions in textbooks up to the end of the 1960s, the beginning of the 1980s, and mid-1990s; the third *cluster* presents the shape features of textbooks for the end of the 1980s and 1990s; the fourth *cluster* shows singularities of Dimensions in textbooks for the 1920s (except the 1925 textbook), 1940s, 1950s, transition to the 1960s, and 1974, 1984 and 1997; the fifth *cluster* presents Dimensions features in textbooks for the 1930s and 1990s (1996).

Reference to the 1925 textbook is made, as it is found in the first *cluster* and is not related to the 1920s textbooks; the 1990 textbook is also grouped in the first *cluster* (and not in a *cluster* with more contemporary textbooks).

Our analyses suggest relationships which result from similarities among textbooks. We found, by considering our analysis matrix, that textbooks from the first

two decades, and those from 1925 and 1990, are similar in Dimensions, thus presenting an approach to Botany teaching focusing on the *notion dimension*. Textbooks from the end of the 1960s and beginning of the 1980s and 1900s in Portugal are similar in Dimensions, presenting an approach to Botany teaching focusing on the *notion dimension*, *functional dimension* (1968 and 1995), and *ecological dimension* (1995). Textbooks from the end of the 1980s and from 1998 in Portugal are similar in Dimensions, presenting an approach to Botany teaching focusing on the *morphological dimension* (1989), *functional dimension* (1998), and *ecological dimension*. Textbooks from the 1920s (except the 1925 textbook), 1940s, 1950s, transition to the 1960s, and 1974, 1984 and 1997 in Portugal are similar in Dimensions, presenting an approach to Botany teaching focusing on the *notion dimension* (except the 1974 textbook), *morphological dimension*, *functional dimension*, and *ecological dimension* (1984). The Natural Sciences textbooks for Primary level students in the 1930s in Portugal, and from 1996, are similar in Dimensions, presenting an approach to Botany teaching focusing on both *notion* and *morphological dimensions*.
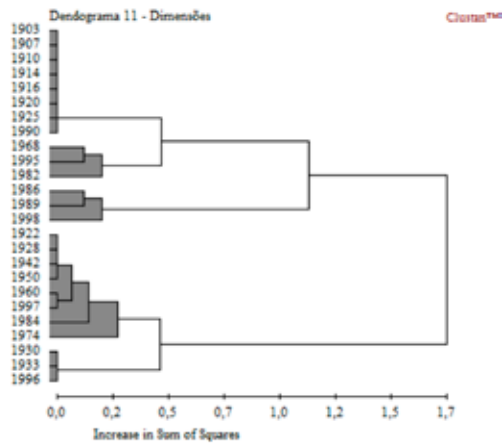
Figure 2 – Dendrogram Dimensions.

FINAL CONSIDERATIONS

A range of signs suggest that botany teaching in Portugal during the last century is a disciplinary area filled with tension. Fluctuations should be acknowledged in the very designations used to identify school textbooks, from Natural Sciences, Natural-Geographical Sciences, Social and Physical Environment to Environment Study. Such modifications reflect changes from a disciplinary approach – Natural Sciences –, to a disciplinary annexation – Natural Sciences with Geography: Natural-Geographical Sciences –, and going on to an environment approach. There

has been a transition from a disciplinary approach to a contextualized approach, with different conceptions of the environment, from a pre-analytical syncretism to a post-analytical, systemic view (Drouin & Astolfi 1986). In this approach, the specific context is the environment, initially the Social and Physical Environment, and later, the Environment Study.

The relation of textbook similarity, principles of appreciation Shape and Dimensions, and the analysis period reveal changes and new approaches in botany teaching (referred to as dimensions in this paper), as well as the inclusion or not of different dimensions of botany teaching in textbooks.

Regarding changes and the appearance of new dimensions of botany teaching, our findings show that the notion dimension has existed throughout the 20th century, with the exception of textbooks published in 1974, 1986, 1989 and 1998. The morphological dimension first appeared in textbooks in 1920, and has remained except for textbooks published in 1925, 1968, 1982, 1986, 1990, 1995 and 1998. The functional dimension appeared in textbooks in 1920 and has remained throughout the 20th century, except for 1925, 1930s, 1980s (but there is an appearance in 1984), 1990 and 1996. The ecological dimension appears in textbooks in 1982 and appears in all textbooks up to the present, except for those published in 1990, 1996 and 1997.

We have found that there are textbooks that only consider the notion dimension in Botany teaching from 1900 to 1920, and in 1990 (seventy years later). We found two textbooks that, besides the notion dimension, only focus on the morphological dimension in the 1930s (1930 and 1933) and in the 1990s (1996). The textbook from 1968, besides the notion dimension, presents only the functional dimension of Botany teaching. The textbook published in 1982 presents only the ecological dimension of Botany teaching, besides the notion dimension. Finally, the textbook from 1998 presents only the functional and ecological dimensions of Botany teaching.

Natural Sciences teaching has undergone significant curricular changes as study contents have broadened. Although a more active attitude is seen in students' teaching-learning processes, we have found textbooks aimed at promoting teaching methods based on the reproduction of knowledge and competencies. This is significant when one considers the weight of textbooks in didactic activities and their importance for the promotion of a written culture in the 20th century. Therefore, school textbooks have been the basis of important pedagogical work by contributing to cultural and social adaptation, even though they have not fostered the strengthening of intervention and reflection capabilities. We have, thus, reported a limited interpretation of Natural Sciences teaching and teaching-learning processes, as well as an instrumental uplift of the scientific culture in which school textbooks have become the core pedagogical medium within the schooling process.

Moreover, we can affirm that the results have shown a relational tendency among teaching programs and textbooks in our sample of school botany. It has been suggested that the rudiments of natural sciences do not comprise a course, but merely general knowledge that should be taught to children through intuitive processes with objects themselves (when available) or with printed aid. Furthermore, the importance has been emphasized of knowing how to read, write and count – the first three types of excellence during Elementary education. Finally, we have observed the use of methods based on observation and experience, suggesting a school botany reminiscent of Lessons of things. We would like to mention the following important points: awareness of the surrounding environment, such as the contact with local plants and their use, satisfies children's curiosity and enables them to obtain useful knowledge for practical life; botany teaching should be availability via various media to study nature objectively, e.g. plant collection by students, plant museums, orchards, and school gardens (Santos 2006); students need to learn how to observe the environment and think deeply about it, so that they may reach the conclusion that people live and get organized in diverse ways interdependently with the environment; the transformation of Nature through work, life experiences, and the interest in distant places are all situations that seek to value and systematize ideas from references provided by the environment in an inference to morphological principles and a national treasure within a manipulative school botany approach. Lastly, a preventive school botany can be inferred from botany contents regarding the transformation, defence, and conservation of the environment.

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EVALUATION OF HISTORY TEXTBOOKS BY YOUNG HIGH SCHOOL STUDENTS

EDILSON APARECIDO CHAVES

This paper addresses the topic of the presence and use of history textbooks in Brazilian schools. It investigates the point of view of high school students attending a school located in a rural area on the textbooks included in the National Textbook Program (PNLD). The research assumes the need to come closer to the classrooms in order to understand what students think about textbooks, and how they use them to learn. The textbooks approved by the PNLD evaluators were made available for students' analysis during history classes, supported by research tools developed for this purpose. The results show that young people are able to analyze, evaluate and choose history books based on criteria related to formal elements, content, activities, and criteria elaborated from their personal and school experiences, thereby expressing their opinions and building arguments to justify their opinions.

INTRODUCTION

The twentieth century was marked by the expansion of the production and use of school textbooks, for both students and teachers. According to Hallewell (2005, 215), there are few records on Brazilian schoolbooks previous to that time. Since the beginning of the Republic in Brazil, the expansion of the public educational system has stimulated the translation and production of national books for the teaching of school subjects and the orientation of teachers for methodological renovation, especially within the context of debates surrounding the movement for New School, which took place in the first decades of the twentieth century.

Thus, over the last hundred years, books have gained strength as an artifact of Brazilian school culture and have been incorporated into the school culture in different ways; they began to influence education in the country from the point of view of teaching contents, as well as the methods of teaching, favoring conceptions and approaches, indicating strategies and resources, and thereby contributing to the definition of constitutive elements of teaching in the different school subjects.

In Brazil, the process of inserting books into school life as part of a federal government's political initiative originated more than seventy years ago, with the creation of the National Book Institute in 1929 and the National Committee of

Textbooks in 1938. The National Textbook Program (PNLD), however, was only created in the 1980s and gradually universalized the acquisition and free distribution of textbooks for all school subjects of basic schooling, including some special programs for specific school populations.

As a result of this expansion in providing to public schools and, therefore, the production and distribution of school books throughout the country, there was also a growth in research interest in the subject, which is reflected in the set of articles, books, dissertations and theses produced. Thus, in addition to other factors, the PNLD is understood as a driving force for studies on school textbooks.

Although studies on textbooks are numerous in the country, with different conceptual and methodological approaches, it is important to highlight the low level of production of research that specifically approaches the school subjects, especially teachers and students, in order to understand the ways in which textbooks affect school practices, teaching and learning.

This challenge has begun to be faced by investigation and guided the realization of research aimed at understanding relations between the school subjects and history textbooks, with the goal of analyzing the point of view of high school students on the materials they use.

RATIONALE AND THEORETICAL FRAMEWORK

In the Brazilian case, questions related to textbooks have specificities that must be considered by the researcher: there is a national program for the free distribution of books for all school subjects to students of basic education in public schools – the National Textbook Program (PNLD). Chaves and Garcia (2013) highlight that the policy of textbook evaluation for elementary schools through invited experts started in 1996, in the context of educational reforms, with universities were called on to partner with the Ministry of Education to carry out this work from 2002 onwards.

Every three years, the Ministry of Education posts a public notice to announce the conditions and criteria for general and curricular disciplines which are to be used as guidelines by the publishers for textbooks for the respective school grades (1st to 5th, 6th to 9th and high school, in addition to others with other specificities). These indicators are later translated by the assessment teams in separated records with items such as: content, teaching methodology, visual programming and graphic quality, as well as citizenship construction. There are eliminatory criteria and classification criteria, and the fact sheets and evaluation results are published in a Textbook Program Guide, in which the results of the evaluation of each work presented by the publishers and approved by the evaluators are made public.

One of the issues addressed by the research in this area points to clashes between the processes and results of the evaluations carried out by the commissions related to the PNLD, and the processes and results of the evaluations made by the teachers inside the schools. According to Miranda and Luca (2004), "Through the PNLD, it is possible to access global trends in teaching history that are linked more to different types of disciplinary knowledge, curriculum and/or derived from distinct pedagogical traditions than to the supposedly normative effects of the program". The authors point out that the results of the program evaluations are optimal sources for recognizing contemporary trends in history teaching, as they highlight concepts regarding historical perspectives and the process of the students' construction of knowledge as linked to the curricular orientation within curricular parameters or, in more specific cases, to a historiography.

The criteria established by the specialists over the last two decades have been refined because of the academic production in the field of history didactics in Brazil. This has led, for example, to elements of new historiographical conceptions finding mention since the 1990s, such as the expansion of the conception of historical documents. The use of different languages as sources for teaching history were also evaluated, such as comics, movies and songs (Schmidt & Garcia 2010).

Recently, specialists have sought support from authors of history theory, such as Rüsen (2010, 116), who points out the qualities of a good history book. For this author, there are essentially four characteristics that distinguish a good textbook: a clear and structured format; a clear didactic structure; a productive relationship with the student and, finally, a relationship with class experience. The author points out that "students have extreme sensitivity to the problems of the present, which adults, who are too personally involved with them, cannot and do not want to allow themselves to have".

In order to investigate the points of view of high school students concerning history textbooks included in the National Textbook Program (PNLD), the research was based on different evaluative studies developed in Brazil (Silva & Garcia 2009, Garcia 2014) and in other countries (Choppin 2004). These studies indicate that, despite the strong presence of textbooks in class and their importance as an element which defines some teaching and learning conditions, there are few which approach classrooms to understand what teachers and students think about school textbooks, and how they use them to teach and learn (Martinez et al. 2009; Garcia 2009).

With these references, the objective of the research was defined with the aim of knowing the opinion of high school students of a specific rural school concerning the history textbook they were using. The rationale for the research

is the fact that there are still few studies on what the youth think about their books and also few studies that reach schools in rural areas to research how history education and learning occur.

CONTEXTUALIZATION OF RESEARCH: OBJECTIVES AND PROCEDURES

The inquiries that guided the research reported here are included in the scope of didactics, with emphasis on history didactics. The aim is to contribute to the debate of history teaching and learning in the specific field of rural education. In particular, the intention was to focus especially on the textbook, an artifact of school culture that is embodied in different ways in school life.

In the perspective of the works of Ezpeleta and Rockwell (1989), this space of conflicts between the norms and daily practices is precisely where the school experience takes place. One of the dimensions of this experience is teaching, the forms that scientific knowledge assumes in the work performed in classes, by teachers, students and the mediation of materials such as books.

Different research instruments were used in order to meet the objective of knowing the students' point of view regarding history textbooks. They were constructed based on responses obtained in a previous study with other young students who conducted book evaluations approved in the PNLD; they were also supported by the official assessment criteria, published in the guide to textbooks organized in items related to the content and format of the textbooks.

The first instrument handed out to the students was composed of ten multiple choice and two written questions, with space to write their opinion and support their answers in the objective questions. A second instrument was given in order to gather information regarding the students' historical knowledge. This was composed of ten multiple choice questions and nine written questions, of which the last two asked the students to present suggestions to authors who write textbooks for young students like them, who live in rural areas.

Finally, a third research instrument was used. The first activity proposed the analysis of textbooks by pairs of students, based on a script; several collections approved in the PNLD were arranged on the classroom table and, like teachers do in the selection of textbooks, the students were able to examine the collections, exchange ideas and choose. Finally, from the choice of one of the available textbooks, the students performed the second activity, which consisted in selecting a chapter for analysis and registering in writing their opinions about elements related to the form and content of the chapter.

With these procedures, allied to the activities of participant observation that were carried out during the school year, it was possible to gain insight into the

opinion of the young students concerning the books approved in the PNLD High School program and also identify criteria that the students prioritized when asked to choose among the available textbooks.

The study was conducted in all three high school classes of Escola Mundial, which is located in a rural area in the metropolitan region of Curitiba, Paraná, in southern Brazil, which teaches students whose families are socially organized around work in the countryside. A total of 112 students between the ages of 14 and 17 participated in the study, most of whom have studied in rural areas since their initial school years. They have access to technologies: everyone uses mobile phones with internet access and a third of them said they use the internet daily. Half of the students reported reading little, which reinforces the relevance of knowing the students' point of view regarding textbooks. More than half of the students expect to acquire knowledge that will improve their level of education and that they wish to continue studying up to a university level.

RESULTS: STUDENTS' POINT OF VIEW ON HISTORY TEXT-BOOKS

The empirical investigation allowed for the accumulation of understanding concerning some elements of the relationship between students and history textbooks and also knowledge of the criteria used by them to evaluate the quality of these books.

The first issue to be highlighted is that the answers obtained from the instruments, accompanied by the observations made in the classroom, reveal the ambiguity of the students' relationship with the textbook. While expressing confidence in the presented historical knowledge, they did not choose the textbook when they were asked to choose the best ways to learn history. In spite of the apparent ambiguity in the opinions expressed by the students – although they have said they trust the knowledge in the book, they also say that it is not the best way to learn – the set of data produced demonstrated a clearly positive relation between the students and the book used.

The students use the book in the classroom independently of teacher guidance, in addition to using it at home to study. In different situations they showed both agreement and disagreement with the contents conveyed by the book, which is an indication that when using the book, they do it carefully. Although they sometimes had a contradictory opinion about the role of books in their school life, the research has provided evidence that, in agreement with Schmidt and Cainelli (2012), the textbook should be seen as an articulated and articulating part of the relationship between teacher, student and historical knowledge.

It can be stated, in connection with the results of the evaluation processes the students have developed regarding the PNLD books, that the elements cited by

the students and the criteria used are closely related to criteria established by the specialists.

a) Regarding the form of presentation of the historical contents

The chronological presentation of the subjects was pointed out by the students as the approach which allows a better understanding of the studied content. Observe the following opinion regarding the qualities expected to be found in history textbooks: *"The chronological form makes students learn about their ancestors, how they used to live and how they have evolved to this day"* (Carlos & Renato).

Although historians such as Chesneaux (1995) have criticized the organization of curriculum content from the perspective of French quadripartism, and this perspective has also often been criticized by Brazilian scholars, it has been observed that there is a consensus among students that studying history in a chronological order is easier because it has a mentally organized evolution of how the facts have developed up to the present day.

This point of view of young people can be understood as evidence that the school work developed by history teachers throughout students' primary education has had an effect on their understanding of certain specific elements of teaching and learning history – in this case the way of organizing content in a linear chronological way. It can also be said that a large number of teachers tend to be closer to chronological history, especially because teacher training in general has also been structured this way. Thus, in choosing textbooks, such approaches are prioritized by teachers. And in using these books, the student, and main user of the book, is taught to think that this is the best way to study history.

As pointed out by Garcia (2014), in a study based on the information published by PNLD evaluators in the guides, the volumes presenting a thematic organization have been losing space in the Program over the past decade: whereas in 2008 four collections of thematic history were approved in the PNLD for the final grade of elementary school, 2011 only saw one of the sixteen approved collections being thematic. According to the Guide to Didactic Books of history, 75% of the books analyzed have an approach which "is based on linearity". A feature of these works, and usually in the context of the past-present relationship being invoked, is that there is no "systemic approach of relationships that allow the understanding of changes in history, as well as of the continuities and ruptures in time" (Brasil 2011, 47).

This finding contributes to reaffirming the predominance of the chronological model, which was pointed out among the young collaborating students of the research as the ideal way to learn history and, therefore, as the most appropriate

model for a didactic book. This meant that a chronological organization was considered by them a good quality of the analyzed books.

b) Regarding the presence of different languages, documents and their usage as sources

The students of the Escola Mundial present diverse understandings as to the importance of the use of sources and languages in learning history. For them, the cartoons, songs, films and images that are available in textbooks and are used by teachers allow a better understanding of what is studied. In open questions in which students were asked to express themselves regarding historical learning, taking into consideration the different languages and documents present in their book, the following opinions can be highlighted:

> *The historical sources present in the textbooks increase our knowledge because often the text alone does not give us all the content, and we can associate the facts with historical documents more easily (Alex).*

Still answering the same questions, Nikael and Paulo state that some books *"could have more explanations of documents, reports, etc"*. For Natalia and Gabrielly, the authors' narratives *"help students reflect and clarify doubts"*. Andreia and Dayane point to a situation clearly related to the specificity of historical learning by stating that *"a Thompson report was included to make students understand more about history"*.

In many answers, it could be observed that students recognized how the presence of different types of documents allow for contact with ways of living and thinking of times distant from their own. The students also stated their opinion regarding the different languages present in the book: "*With the lyrics of the songs presented in the book it is easier to remember and understand than with the text (Edite; Ana)"*.

The students' statements make it clear that there is an understanding that working with different languages is adequate for the construction of knowledge in certain subjects. This allows us to state that some knowledge on the historical method is present in the ways through which students understand and explain their opinion about books – still without the more complex perspective of the teacher/researcher – noting that different languages help produce meanings and are therefore relevant elements of the process of construction of historical knowledge.

The students Nando and Iago's perception that an image alone does not allow them to access historical knowledge in a more complete way must be carefully observed. This could be related to the problem pointed out in works such as those of Silva (2013) on the use of documents in textbooks, according to which documents are presented, but not used as sources for the production of historical knowledge by the authors.

c) Regarding the didactic activities proposed in the books

In general, the students understand that the activities have great importance in the process of construction of historical knowledge; they contribute to the learning process. The students participating in the research were asked to evaluate the activities proposed in the PNLD material selected by them. Of the 91 students participating in this evaluation activity, 86 indicated that the activities proposed in the textbooks were great, good or regular.

Some students evaluated the team activities and discussions to be more productive, as well as also helping increase the possibilities of raising issues in the classroom, and thereby harnessing other classmates' knowledge in the search for a resolution to questions. This type of response can be compared to one of the approval criteria expressed in the PNLD evaluation form. Elaborated on the basis of the criteria set forth in the PNLD public notice, the document asks the evaluators to observe whether the work favors "collaborative learning by stimulating student interaction and exploring multiple socialization activities in a varied way throughout the project." (Brasil 2012, 133).

However, other students value the more traditional activities that ask for answers to questions formulated from the didactic text. According to them this would better contribute to organizing the understanding of the ideas contained therein. This opinion may be related to the fact that textbooks are usually long and include a large quantity of information and relationships, which would make it difficult to locate the most relevant ones, or those that would be a priority to memorize or understand. The questions that extract such information from the text were therefore considered positive by some students.

A significant number of students, such as Marilia, Lilian, Hanna and Mina, argue that every book should present questions from the National High School Examination (ENEM) and from entry tests for Brazilian universities, so as to be familiar with the questions proposed in the main entrance exams for universities. This is a relevant criterion for many students while, at the same time, also qualifying the book. It is also evidence that, for this group of young people from a rural school, higher education is an larger undertaking, running contrary to what has been found in other urban youth surveys or rural areas. This highlights the diversity of ways in which students live out their youth, which is not defined only by the geographic location of these populations.

Although officially characterized as a "Country School" and located in a rural area, the Escola Mundial serves a community of rural workers with a background of European immigration to the region and who have owned their land for some time. This school also caters to other residents who, although living in the the same area, carry out their work activities in the urban area of the municipality.

Finally, there is one more aspect that also deserves to be highlighted, which establishes a dialogue with the literature of the field of history teaching. Only a few students, such as Leandro and Rafael, pointed out that the activities are good because *"they propose research in newspapers and on the internet"*. This emphasizes the importance of the book referring students to other sources of knowledge, besides the book itself, as is suggested in the PNLD criteria.

It can be concluded that by evaluating the activities present in the textbooks the Escola Mundial students were able to point out qualities and problems in the material examined by the PNLD. Their focus has been on more conventional formulas that emphasize memorization, and little stimulate the construction of historical knowledge, especially those through investigative activities. However, it was also possible to verify that there is a strong concern with the universities entrance exams, which is not necessarily a problem and expresses their expectations for the future in terms of the studies.

d) Regarding the relationship of the contents with the experience of the rural youth

One of the relevant issues in the discussions about rural education is related to the need for teaching contents to be adequate to the specificities of the students' lives and the community served. On the other hand, the evaluation of the books by the PNLD over the years has helped consolidate criteria regarding the adequacy of content to the students' reality. The diversity of experiences of social groups should be considered by the authors either in the didactic texts, or in the images or other elements used.

The research therefore sought to connect this issue with the relationship between the students' social experience and the knowledge presented in the textbook, requesting the students to verify if the subject in the chapter chosen for analysis would relate to their life and their history, or to any situation that might be relevant for their future.

In general, few students indicated the existence of specific relationships between the subject matter, their life and their history. For some students, there is the understanding that the stories present in the analyzed textbook have some relation to their lives, but not always manifesting awareness of how past events have affected the present life.

Observe the opinion that follows: *"Yes [it has a connection with my life] because I live in a place colonized by Polish people who came after the World War I".* However, the same young man clarifies that the connection is only partial: *"it has not connection with my history, only with my grandparents"* (Edenilson). Therefore, he sees no connection between his history, that of his ancestors and the

present life, showing a simplified view of historical processes which affected not only his community but a substantial part of the life of the municipality where the school is located, and the country due to immigration and land distribution. The official history attributes a determining role to the immigrants in the constitution of the municipality, valuing cultural traditions and productive activities of these groups and thereby reinforcing the preservation of their memories in the local identity.

The relationship is not always understood by young people as based on the book itself. Contents such as World War I, included since elementary school and often indicated by the teachers as a subject that interests the students, were evaluated by the students of the Escola Mundial as not having any relation to their lives, nor to the present in a broader way, as it is observed in Daniel's words: *"It has no connection, because it was a war that happened a long time ago and does not affect the youth of today"*.

On the other hand, for a few students the understanding of these relationships was associated with the possibility of critically understanding the present. For Agda, the books themes should be worked out in a way to allow students to *"learn more, study more, and develop a critical thinking about it"*. From her point of view, the way in which the book presents content does not make students more critical and active, which would then depend on the work of teachers.

A similar perspective was put forward by Rodrigo when he stated that history books can contribute to making young people more critical. He said that *"if young people knew about the history of Brazil they might understand it better and criticize the society in which we live"*. This student chose to analyze a chapter on the Brazilian civil-military dictatorship and the subsequent process of democratic opening and recognizes that the textbook contributes to the knowledge of the country's history and that this knowledge can make a difference in understanding reality.

The difficulty of a large part of the young participants in establishing such relationships indicates that it is necessary to create the right conditions in the didactic works and history classes so that students can make connections between the moment they live in and the past when those people lived who helped build their present time. Books and teachers need to stimulate them to ask questions about the past, referencing the evidence of this past that remains in the present, in order to create hypotheses related to the past and to construct plausible explanations for what happened, as well as to understand their effects in the present.

In Paulo Freire's perspective, one of the characteristics of critical consciousness lies in the "deep yearning for problem analysis and not satisfaction with appearances" (2011, 40). It may be inferred that some of the students, such as Agda and Rodrigo, are aware that historical knowledge is one of the instruments that

can help them understand the present life in depth by understanding the past – as made clear through their inclusion of elements that relate to the construction of citizenship in their evaluations. It should be noted that one of the specific eliminatory criteria for the curricular component of history is related to the requirement that the book should stimulate reflections regarding contemporary society. In this sense, a book will be disqualified if it does not "awaken students to the historicity of social experiences, working on concepts, skills and attitudes, with the perspective to build citizenship." (Brasil 2012, 15).

FINAL CONSIDERATIONS

Educational research of didactic and epistemological nature can establish an effective rapprochement with young people and capture their opinions about elements of teaching, including the criteria they use to analyze their textbooks. The study demonstrated that the students indicate criteria of different types – including criteria regarding the referred science as well as the preference for chronological history – and they were able to elaborate and apply criteria that are in part coincident with the criteria used by the teachers to choose the textbook that will be used in school.

In Rüsen's perspective, there are essentially four characteristics that distinguish a good textbook. And as for the students, how do they see the structuring of the book? Which aspects do they favor? What do they consider when evaluating the quality of a book? Within the limits of this text, some elements were selected to show that, in general, the young participants of the research were able to identify positive and negative elements of the didactic book, using criteria that, in part, correspond with the academic literature and with the PNLD criteria.

From a quantitative point of view, it can be seen that most of the young people worked on criteria of a general nature, showing evaluations strongly marked by concerns with the type of text, illustration and activity. This finding suggests that books, although approved in national programs, may not meet the needs of these students regarding the size of texts, language, approach to concepts and the insertion of adequate images with the purpose of assisting the understanding of the written text.

As for the specificity of history content, the research indicated an understanding among a significant number of students that, in order to learn history, it is necessary to have contact with documents – an opinion that can be taken as indicative of some work developed during fundamental schooling. As for the chronological presentation of the subjects referred to by the students as a criterion for choosing the book, it was evident that although there are collections of thematic history available, the previous school experience of these young people was more linked to the perspective of chronological organization.

For Rüsen, "the real purpose of a history book is to make possible, promote and favor the learning of history" (2010, 112). Thus, one result of the research to be highlighted is the recognition that, as privileged users of textbooks, young students who have seldom been heard by surveys and schools would have much to say about the books they use. They understand the importance of the textbook in their school life and can mention how and when they contribute to their historical learning.

Finally, it is interesting to note that the criteria pointed out by the students very much overlapped with the selection criteria of the teachers of the school where they study. Therefore, there is potential to continue studies in this subject, so as to better understand the relationships between the choices of these school subjects, the relationship between the choices and their later experiences with the chosen books.

In different ways, the students who collaborated with the research showed that they are able to analyze, evaluate and choose based on criteria, and some of them even elaborated analysis based on their personal and school experiences. Without transferring the responsibility of choosing the books being used to the students, the conducted research showed that the young people observe, evaluate the books, express their opinions and elaborate arguments to express their opinions regarding the books, and thus could have their points of view considered in the processes of book analysis and selection by schools in Brazil.

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RESEARCH ON MUSIC TEXTBOOKS IN BRAZIL

GUILHERME G. B. ROMANELLI

This article presents an overview of research conducted on music textbooks used in Brazilian regular schools. It begins with a short historical analysis concerning the first samples of music textbooks used during the colonial and imperial periods, culminating in the textbooks used within the framework of the 1930s model of music education that lasted for over 30 years. The complex task of defining which music books are to be considered textbooks with educational purposes is a starting point for understanding the influence of the intense conservatory tradition within music education. The article carries out a survey of research made on Brazilian music textbooks, especially those conducted by the group of researchers from universities of *Rio Grande do Sul* and *Minas Gerais*, two Brazilian states that pioneered music textbook research. It also highlights recent research on this topic performed by graduate programs at Brazilian universities and presented in scientific meetings and conferences. This paper also highlights research done on books relating to the National Brazilian Program of Public Textbooks, known as PNLD, with an approach illustrating the economic issues related to the government purchase of millions of textbooks which are then sent to schools all over Brazil. The present research intends to illustrate the complex and difficult path of the production and circulation of music textbooks throughout Brazilian history, with the aim of offering arguments for the organization of a flourishing in the Brazilian production of new music textbooks.

INTRODUCTION

Music was taught and studied in Brazil long before the arrival of the first Portuguese settlers in the 1500s. It was a cultural practice among the many million indigenous peoples who spoke over a thousand different languages. However, a systematic teaching of music related to a school tradition (in the western European sense) only started in Brazil in the mid-1500s, with the educational endeavors of the Jesuits. With those clergymen, the first teaching methods and early music textbooks became anchored in Brazil.

The following, short historical outline introduces the purpose of this chapter, which is to offer an overview of research conducted on music textbooks adopted in Brazilian regular schools.

As a method of research, this paper is based on a systematic bibliographic survey, taking as its references: the thesis and dissertations of music graduate programs from the main Brazilian universities; articles from the main Brazilian scientific music journals; and the few books edited in Brazil that include chapters about music education textbooks. For the initial systematization of the different databases, an assortment of keywords which could be assumed to have a relation with music textbooks was implemented. Considering the wide amount of terms referred to in those textbooks, a combination of keywords was applied, e.g. music textbook, music method, music school book, music learning book, music exercises, music lessons etc.

In addition to this research, some personal knowledge was also drawn on, based on the author's experience as a music textbook writer, textbook reviewer and graduate student advisor.

A BRIEF HISTORICAL APPROACH AND BRAZILIAN CONTEXT

Ratio Studiorum, the Jesuit's codex for education written between 1591 and 1599, did not mention music (Holler, 2010). However, these religious pioneers soon realized that, in order to catechize the indigenous Brazilian populations, music should be seen as a privileged form of approach. When they understood the musicality of the natives, they demanded special permission from their superiors in Rome to incorporate music in their catechizing efforts. Even if the Society of Jesus encountered some resistance to the inclusion of music in their intellectualized form of worship, music soon became an important matter in education, as can be seen in the *Belém* seminary documents (city in northern Brazil – Amazon). (Holler, 2010).

Taking into account the Jesuits' intense educational work in colonial Brazil from the mid-16th century onward, it is possible to presume that they had written documents to guide their music education and that those documents could be considered the first Brazilian music textbooks. The very few written documents that have survived until today are the theatrical works from the Jesuit priest José de Anchieta, dating from the mid-1550s and including melodies. Since those texts have the purpose of teaching Catholic doctrine, they can be considered a form of didactic material.

As seen above, very few historical sources can trace a solid concept of how music education was systematized during the early colonial period in Brazil. Although it is possible to study the flourishing musical practices and education in late colonial *Minas Gerais*, *Rio de Janeiro* and *Bahia*, we still have almost no research on music textbooks from before the beginning of the 20th century.

By the end of the 19th century, music education can be found in public and private schools, although in a quite restricted segment of the population. It is only at the beginning of the 20th century that music education appears more consistently in public educational policies. Although music education in Brazil has followed a long and complex path in the last hundred years, music textbooks were constantly present, and some can even be considered publishing successes, such as Lozano's work "The Happiness of Singing" (from the 1930s), which reached the astonishing mark of 137 editions (Souza, 1997). This shows that, besides fragmented public policies concerning music education, music textbooks frequently found their place in Brazilian schools.

In 1931, under the influence of the Brazilian composer Villa-Lobos, the "Orpheonic Chant" (a form of school choral practice) was officially instituted within a nationwide music curriculum and lasted for more than 30 years. During these years, there was an intense editorial development in music education manuals (Rajobac, 2016), with the vast majority relating to the orpheonic chant. In 1971, an educational law dropped music education, replacing it with artistic education – a multipurpose school activity (without the status of a school subject) that comprised visual arts, music and drama. It was at that moment, with this official curricular demand, that a phase of important music textbook production took place (Souza, 1997). In 1996, a new nationwide educational law (still in force today) defined art as a mandatory subject, still with a multipurpose design (visual arts, dance, drama and music). Once again, there was a flourishing within the editorial market with the publication of several collections of art textbooks (which included music). As highlighted above, in every educational law movement there was an important art/ music textbook production. These temporal marks are also the ones that provide an orientation for the majority of research concerning music education textbooks, that is: colonial times; 1930s orpheonic chant; 1970s artist education; and 1990s art education.

In more contemporary cases, the National Brazilian Program of Public Textbooks, known as PNLD, published public notices to purchase art textbooks (which include music) for high schools in 2015, for elementary schools in 2016, for junior high schools in 2017, and again in 2018 for high schools (new editions). These public textbook purchases invigorated the editorial production and, in some forms, the research about art/music textbooks. These public policies constitute an important field of research, especially when taking the large scale of the PNLD program into account, which spends more than U$300,000,000 in purchases per year, including over U$15,000,000 for art/music textbooks alone. These vast sums underline the importance of textbook research that aims to investigate government programs for school textbooks (Choppin, 2004).

THE CHALLENGE OF DEFINING A MUSIC TEXTBOOK

Defining a textbook as an article of education is a difficult undertaking (Choppin, 2004), since its real nature is one of a complex object hidden under a layer of presumed banality (Choppin, 2000). A quite adequate description of the textbook is offered by Sacristán (2012, 21), defining it as "a book to be taken to the classes, to do exercises, and not for entertainment. It relates to the performance of academic tasks, an information source to be used in exams, and is taken as an in fact unpleasant element to be overcome by academic success". Choppin (2000, 120) also offers an interesting definition, characterizing the textbook as "a non-periodic printed work made to teach, that was produced with a certain explicit intention and in accordance with a particular historical moment". Though, while definition attempts may be suitable for traditional school subjects which use verbal language as the main channel of communication, meaning the great majority of school textbooks, they do not represent a good fit for music education.

In western European culture, music is written with a particular code which includes musical notes on the staves (pentagram). This is the reason why numerous traditional music textbooks, written to be used in regular schools, mainly contain a collection of music sheets – such as the Villa-Lobos method in Brazil, the Kodály method in Hungary, and the Orff method in Germany. This practice indicates the influence of an intense conservatory tradition in school music education.

Music conservatories are schools where musical instruments are taught following systematic learning models. The majority of musical methods for teaching instruments are made from a compilation of various practical, music-focused parts. For example, Rodolphe Kreutzer's (1960) violin method, considered an essential textbook for violin teaching, contains only one or two written pages (depending on the edition), and 42 music sheets distributed over approximately 80 pages. A very rare exception in violin teaching methods written in text is Carl Flesch's "Problems of tone production in violin playing" (1931), where music sheets are only used to illustrate examples from the written text and to provide a six-page appendix of proposed exercises.

In an attempt to define music textbooks, Souza (1997, 11) describes them as "books which, in an explicit or implicit way, intend or try to systematically initiate students into the theories and practices of music". This wide definition brings with it challenges in categorizing a certain work as a music textbook. For instance, there are small booklets that are distributed as educational materials to students who attend "didactic concerts" presented by orchestras (Andrade; Marge, 2016). When questioning if they could eventually be classified as textbooks, it is important to point out that these works provide information about the composers, the musical instruments of the orchestra, the role of the conductor and many other musical issues. Furthermore, these booklets are utilized by students as a support

for new insights in an educational environment, since they are accompanied by their school teachers in a field school activity. That would imply that both those small booklets, or the quoted violin methods, are suitable for being considered music textbooks.

Souza et alii (2009) reinforce the difficult task of defining a music textbook, highlighting how this challenge may have its basis in an understanding of what can be considered a "text". While the text for many school subjects may be written in letters, the music score can frequently assume this role in music (Romanelli, 2015).

Reys (2011) conducted a research study in southern Brazil on cello methods for children at a beginners' level and introduced the idea of a musical instrument's method as a textbook as one of the main discussion points. She supported her arguments through contributions from Roger Chartier and Alain Choppin. This matter was explicitly discussed in an article that questions the word "method" as a synonym for music textbook (Reys & Garbosa, 2010).

However, Maura Pena (2012) indicates the need for caution when assuming that didactically written music works as an aid for music methods (in a textbook sense). For the author, the principles and functions of music education in those methods should be detected in a detailed analysis prior to investigating the educational purpose of some of the works.

Garbosa (2009) offers an important contribution when discussing music textbooks as cultural objects, as based on Roger Chartier's theoretical reference. The emphasis is on the complex relations built around the textbook, including its production and the multiple appropriations by the readers (students). To support her arguments, the author includes a survey on school singing practices in Brazilian history (particularly in the first half of the 20th century) and the role of textbooks in this process.

BRAZILIAN RESEARCH ON MUSIC TEXTBOOKS

The objective here is not to list all the research studies exploring music textbooks made in Brazil, but to allow a glimpse of the mainstream trends within the nationwide production in the field. For this purpose, some representative articles from different research perspectives were chosen to describe a wide view of Brazilian production on music textbook research, as opposed to a comparative approach.

The overview presented in this text categorizes music textbooks in two main groups. Textbooks made for regular school and textbooks made for music schools (such as music conservatories). They may be mixed, depending on the outlined research.

The most important work published about music education textbooks in Brazil is "Music Textbooks for School: A Commented Bibliography". (*Livros de música para a escola: uma bibliografia comentada* in the original Portuguese title). Organized and compiled by Jusamara Souza (1997) from the Federal University of Rio Grande do Sul – UFRGS (southern Brazil), this book is the result of wide-ranging research made in libraries, bookshops, private collections, as well as used book stores. This book encompasses a review of 223 music textbooks published between 1906 until 1997 (the year of publication).

The research was mainly conducted in libraries (public and private) and bookshops in the city of Porto Alegre, southern Brazil. Although geographically isolated from the rest of the country, its importance and size make it representative of Brazilian publishing and the circulation of music textbooks. So far, it is the only book published in Brazil that is entirely devoted to music textbooks. This highlights how large and untouched this research field still is, as well as the need for structured research studies and groups (Lucas, 1997).

Despite the excellent bibliographic review, a clear method regarding the research template used in the 223-book analysis is not distinguishable. Without an indication of a standard form of textbook review, it is difficult to see parallels in the content analysis. This is probably due to the nine different authors who wrote the book. Orientations concerning the organizing of music textbook analysis are still rare, but there are some efforts to indicate a possible path of research that may bring some accuracy to the data construction, such as the proposal made by Claire Roch-Fijalkow (2006) which suggests a standard form for reviewing music textbooks. However, this constitutes a challenge due to the multipurpose nature of music textbooks (discussed above). In Souza's book, there is a clear division between music textbooks for school and those for conservatories (term used in this chapter to name a wide variety of music schools). This poses a challenge that is specific to research on music textbooks, since there are no similar divisions for other school subjects. For example, it is not common to find a mathematics textbook that is not made for a regular school (the same stands for history, chemistry, physics and so on).

Jusamara Souza's book encompasses a significant number of reviews of music textbooks that are mostly comprised of a selection of multiple music scores, which renews the discussion of what could or should be considered a music textbook. The reviews also reveal the multifaceted educational conflict that has characterized the music subject in Brazilian schools since the early 1970s, as a number of studied textbooks not only comprise music, but other artistic fields. In that decade, a general "art" school subject was institutionalized, combining visual art, music and drama as a single subject taught by just one teacher.

Since the main object of music education is music itself, the phonogram/audio materials are mandatory for any music textbook. This question is raised

in the 223-textbook review and reveals the economic and technical challenges constituted by the inclusion of music media in the books. This fact raises additional publishing challenges when considering the economic pressures inherent in textbook production, particularly when "curricular systems" are included as part of extensive commercial issues (Apple, 1989). Those curricular systems are more common in Brazil in the last decades and characterize the policies of the major editorial groups.

Besides the important scientific production contributed by the UFRGS research group, one can also highlight the research conducted by the Federal University of Uberlândia – UFU (central-eastern Brazil), especially those supervised by Lilia Neves Gonçalves, which mainly took place at an undergraduate level. Fernanda Oliveira (2007), a graduate student of Gonçalves, conducted research at the UFRGS and presented an overview of teachers' conceptions on didactic materials in music classes at regular schools. The teachers are the main research subjects here, allowing for an important perspective concerning didactic materials and granting insights into their use.

In Oliveira's article (2007), didactic materials and textbooks are combined to form one body of research. In this conception, textbooks are studied along with other didactic supports, such as music recordings, musical instruments, computers and other music education materials. This conception is not that uncommon in research on music education textbooks and educational media in Brazil and constitutes a challenge in the mapping and categorizing of this field of research.

The absence of the study of didactic music materials during undergraduate teachers' formation is reported by many of Oliveira's interviewed teachers. This fact reveals the "invisibility" of the textbooks as related by Garcia (2013), as they are rarely seen as relevant subjects in university courses. The survey participants emphasized that it was more the peer experiences during professional life that enabled occasions for getting to know and study didactic materials, very often during teachers' in–service training situations. Some teachers highlighted the importance of music textbooks as a way of learning how to teach music, meaning a clear use of the textbook to form teachers. This can be understood as a form of instrumental function of the textbook as raised by Choppin (2004), an attribute of the textbook that is even explicit in Brazilian official textbook programs such as the PNLD) (Brasil, 2014).

Oliveira (2007) points out different forms of use for the music textbook in accordance with the teacher's perspective. This is a very uncommon point of view for Brazilian research, although Oliveira's research is based on teachers' testimony rather than on classroom observation. The author also presents information about the selection of music didactic materials, especially textbooks. This is a rare

perspective in textbook research and was also carried out in research studies in other fields, such as history education (Chaves; Garcia, 2014).

From all the didactic materials referred to by the teachers interviewed by Oliveira (2007), the textbook is singled out as the most important. However, teachers tend to criticize the Eurocentric and music conservatory emphasis of these support materials. Finally, Oliveira's article highlights school teachers as textbook writers, a very interesting perspective considering the relatively small production of music textbooks in Brazil.

A network of researchers from both mentioned universities (UFRGS and UFU) conducted research on music textbooks through the analysis of 432 books – published between the 1920s and 1990s (Souza et alii, 2009). As a theoretical framework, references from cultural history based on Roger Chartier and Bourdieu's field theory were used. This theoretical dialogue opened up questions such as: How were the music textbooks contents selected and organized? Which music education concepts were implicit or explicit in the textbooks? What are the connections between the textbooks and the official educational orientations? Such questions deepen the quality of analysis of the textbooks, surpassing a mere descriptive study.

Teresa Mateiro (2013), along with six of her graduate students, published an index of all the works published by the Brazilian Association of Music Education (ABEM) between 2006 and 2012. A total of 1,456 texts were collected, offering a clear overview of research subjects in the most significant Brazilian association for music education. Only nine of all the listed research studies had any correlation with textbooks. This shows the chasm in Brazil between textbook production, on one side, and research on textbooks, on the other.

In the past decade, a set of research studies concerning music textbooks contributed to the discussion of textbooks used in the teaching of musical instruments. This group featured an analysis of cello methods for children at a beginners' level (Reys, 2011). This research focuses on the usage of the methods in class.

Paulo Egídio Lückman's doctoral research (2017) presented a deep analysis of the didactical attributes of a beginner's violin method made for the Brazilian context by Luis Soler (1920-2011), a Catalan violinist who settled in Brazil. Written in the early 1980s, this method is a very original violin teaching proposition made specifically for the Brazilian context that defies the Eurocentric conservatory tradition.

In 2017, Frederico Pedrosa presented his master's research on the aims and limits of writing a textbook for teaching the five-course, 10-string Brazilian guitar (known as *Viola Brasileira*). The originality of this research lay in its proposal for the production of a manual for a musical instrument that is mainly learned through

cultural practices based on oral tradition. In order to establish his arguments, he undertook a deep cultural immersion in the daily cultural life of traditional communities and founded his approach on research methods from sociology and anthropology.

Bruno Leonardi (2008) also studied music textbooks related to teaching musical instruments. The focus of his research was the choice and use of textbooks throughout all Brazilian undergraduate programs for tuba (a musical instrument from the brass family). His work revealed the intense foreign influence of the chosen textbooks with very little presence of Brazilian music. This lack of local cultural references is a challenge often faced with music textbooks used in Brazil, since they are mainly related to Eurocentric educational models.

Concerning the textbooks adopted in regular schools, Maria Cecília Torres (2011a; 2011b) conducted a research study with her undergraduate students which encompassed an overview of 47 different methods. The author understood that a close study of music methods (frequently used as music textbooks) was an important issue in teacher's formation. A careful analysis of the 47 reviewed textbooks shows a fairly fragile composition, since it is difficult to establish semantic parallels between the books, due to their uneven content and educational purposes. There should be doubts raised about some books being considered textbooks. This situation once again reveals the problems inherent in defining what a music textbook should be. On the other hand, Torres' article (2011b) presents a very rich set of undergraduate students' testimony which reveal their points of view on those educational resources.

Vivian Barbosa (2013) focused her research on textbooks written for elementary school. Three collections were reviewed using an adaptation of Roch-Fijalkow's (2006) standard-form content analysis for music textbooks. She emphasized the directive conception of the books, probably due to fact that they were written for generalist teachers who, in most cases, have a very deficient music training. The studied books also unveiled a large number of misconceptions on music subjects, revealing a theoretical fragility of books written for non-specialist teachers.

Focusing on the investigation of music textbooks used in both public and private schools, Romanelli (2015) studied the status of music textbooks in a flourishing new editorial environment that has arisen since music became a mandatory subject in 2012, following more than three decades as marginal curriculum content. Here, it was possible to identify that one of the challenges facing the new textbooks was the task of overcoming the distance between traditional music textbook content and the popular musicality of the Brazilian people, which meant having to overcome the strong inertia inherent in the Eurocentric conservatory tradition. Those research studies were also able to present a scenario of renewal for Brazilian music textbooks, presenting different methodological approaches.

A wide overview of the described research studies allows for the statement to be made that the analysis of music textbooks tends to go beyond the mere description of content relating to subject learning orientation (e.g. didactics of music), pushing discussions on larger issues such as the social and cultural models underlying the books. As an example, there are orientations inside some music textbooks concerning how to behave at a classical concert, suggesting not talking or eating in the concert hall. Those issues are better understood through a sociological perspective, such as with the contributions of Bourdieu and Darbel (2003) that relate the access to cultural experiences to the maintenance of certain cultural status.

There are some works in the field of textbook research that offer a historical view of education, highlighting the textbook as a historical document. This perspective often understands the textbooks as historical archives of education (Escolano Benito, 2006). Following this direction, Raimundo Rajobac (2016) presents an analysis of music textbooks from the perspective of the history of education, in particular music education in Brazilian schools. He studied a collection of textbooks from the 1930s that met the standard of the official music curriculum (orpheonic chant) and revealed the complex coexistence of traditional and vanguard educational models. This research also highlights the significant status of music in the nationwide education policies.

Beyond the research on music textbooks, it is important to consider the investigations made concerning textbooks for the general "art" school subject. Those books assemble visual arts, dance, drama and music topics, which is the reason why they are referred to as multipurpose. Denise Valarini's (2016) research had its main focus in visual arts, but also opened up some interesting aspects on other arts, such as music, as the seven-book collection she studied was of a multipurpose structure. Her conclusions showed that misconceptions on music and its role in school are still very present: e.g. stereotyped profile of composers and projects organized around musical instruments made of recycled materials that do not have a sonorous quality.

The nationwide public program for selection and distribution of free textbooks, PNLD, is a growing field of research for many school subjects, and also for general art textbooks. Teuber, Schlichta, Ribeiro and Romanelli (2016) began a research group in 2015 to systematically study all the officially selected art textbooks. The main focus of the studies was to understand the selective tradition of schools that define what topics and concepts of art should be privileged in public schools (frequently highlighting the local versus Eurocentric art education conceptions). Those research studies also try to contribute to the complex multipurpose aspect of the books that bring together visual arts, dance, drama and music. Beyond a critical perspective that often marks research on textbooks, Teuber, Schlichta, Ribeiro and Romanelli (2016) have evidence which states that art textbooks have improved since they became part of the PNLD program in 2015.

OUTLOOK ON MUSIC TEXTBOOK RESEARCH IN BRAZIL

Since general art textbooks have only been included in the PNLD national program in the last four years, it is possible to assume that this topic will constitute a major field of research for the years to come. There is no doubt that public, nationwide programs influence the writing of textbooks, sometimes improving their quality as Valarini (2016) illustrated.

Music textbooks have music as their main object. That means that students should imperatively listen to music during their classes, but there are big challenges faced when including music media within the books (Romanelli, 2015). This should be another privileged field of research, especially considering the high costs of music copyrights and the technological revolution of the last twenty years relating to the many forms of music listening. Souza et alii. (2009) pointed out the need for research in this field, but very little investigation has been done in the last decade.

Further research could focus more on music textbooks as historical documents, which may enable a better overview of the complex path of music education in Brazil (Romanelli, 2013), as has been stated by Souza et. alii. (2009). Those research studies must be carried out with a cautious approach, as Choppin advises when he discusses the use of textbooks as historical evidence.

Another important contribution of future research could be drawn from a model of analysis for the study of music textbooks as proposed for the French context by Roch-Fijalkow (2006), or in the adaptation of the Artur Aran (1999) model for music materials. The design of a grid template would be a necessary step for promoting comparative studies between different textbooks.

Even with the many research possibilities shown above, our main concern in further research may be based on the uses of music textbooks. Some research studies have been conducted in this direction, as Reys (2011) highlights in her work. It would be a very interesting path of research to conduct studies on the uses of music textbooks in the classroom. The ethnographic approach based on Rockwell's propositions would offer interesting data, as Chaves and Garcia (2014) have been able to achieve in the field of history as a school subject.

Many of the research concepts presented above are taken from future research projects of the NPPD (*Núcleo de Pesquisa em Publicações Didáticas*), a research laboratory associated with the Federal University of Paraná – UFPR and coordinated by Dr. Tania Braga Garcia.

CONCLUSION

This chapter presented an overview of the research conducted on music textbooks in Brazil. It put forward a selection of books, book chapters, articles, thesis

and dissertations that highlighted the long and complex path of the production and circulation of music textbooks in Brazilian history. It was not intended to exhaust this theme, but rather to point out the large field of research still understudied, especially when taking into account the new status of music as a mandatory subject in Brazilian schools since 2012. The impulse to engage in new research on textbooks and musical education is clearer if we consider that Sousa's research (1997) is the only book on this topic published in Brazil in the last twenty years!

Through this brief survey of music textbooks research, it is possible to illustrate that the main portion of the works are predominantly focused on the description and analysis of the books. Very few works offer practical classroom conceptions about those books, especially from the teachers' point of view. The influence of the intense conservatory tradition in music education was quite evident in several research studies and reveals a specific inertia in music education practices within some educational contexts.

Research focused on the choices and uses of textbooks are still sparse. When they exist, they are mainly based on teachers' perspectives as revealed through interviews. It was not possible to find a research study concerning the uses of music textbooks that had resulted from systematic observations, such as would be achieved through an ethnographic approach.

Almost all the research studies presented in this text were about printed music textbooks. Other educational media, such as software and web platforms, would demand new research. This direction would fit the intense technological revolutions of the recent years, that have involved new ways of producing, circulating and listening to music.

In spite of the efforts by the UFRGS and UFU universities, it is possible to see that we still do not have a main national laboratory for the study of music textbooks. This may be connected to the lack of extensive music textbook collections, as illustrated by the challenges faced by research studies performed by Souza (1997). We would need more focus and special attention paid to the organization and cataloging of textbooks by university libraries, so as to raise their importance closer to that of the other, more 'scientific' books.

Finally, it is possible to state that there are still very few research studies on music textbook carried out in Brazil (considering it is a country with over 200 million inhabitants), and we hope future overviews on Brazilian research concerning music textbooks will offer a larger number of studies.

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RESEARCH ON MUSIC TEXTBOOKS IN SPAIN

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INTRODUCTION

The purpose of this paper is to review the research literature regarding the various perspectives and lines of research that have been developed in recent years on textbooks and teaching materials in Music Education. We have classified the research following comprehensive, non-exclusive, and non-unique criteria. We have taken into account the curricular point of the music material and its impact on political discourse. Materials were also analysed according to different grades. Finally, we established a group of particular interest with respect to the elaboration and experimentation of different didactic and music materials.

In recent years, our country has seen an increasing interest in didactic materials for music, as well as a growing interest in their study (Huggett, Gurney & Jumlet 2016). These materials often receive little attention from the teachers who use them. The analysis of these resources also brings to light the shortcomings of publishing and audio-visual markets, regardless of education stage. This paper presents a pathway to the knowledge of music materials. To this end, we have reviewed a significant number of national scientific studies.

Throughout, we can see that the paradigm underlying most published didactic materials is based on individual technical-professional development, literacy learning and purely musical skills (Vicente 2017).

In addition to studies from other regions of Spain, the analysis of music materials has been the focus of considerable debate in Galicia (Vicente, G. 2010; Vicente, R. M. 2010; 2017). The question is specific: is music present in school materials? This paper is based on nationally published research regarding music materials.

Among the sources consulted, scientific and professional education journals were reviewed. From international circles, we have analysed research put out by ISME, the worldwide association of music educators, and MERYC, the European association of preschool education and music, as well as studies published by IAR-TEM, the umbrella association of scholars from around the world who debate on didactic materials. The findings of this research will enable us to develop an approach for analysing music materials, valid for any stage of education.

Here we outline the main lines of research on published materials for music education in Spain since 1990, when the most important political change took

place in education (LOGSE). At that point, music education was considered a subject in its own right with its own teachers in primary and secondary school. Thence, studies on music education at these stages grew significantly. There has been a proliferation of didactic and music materials by educational, literary and cultural publishers over the last 25 to 30 years. Furthermore, the materials published by education companies have the largest share of the education market and are, therefore, used by the largest number of schools.

METHOD

Our aim was to determine the state of the field of teaching materials in preschool education. Among other sources, we reviewed the following scientific and professional journals on education: EDUTEC, Revista electrónica Complutense de Investigación en Educación Musical, Música y Educación, Revista Electrónica de LEEME, Revista de Psicodidáctica, Revista de Educación, Revista Española de Pedagogía, Estudios pedagógicos, Perfiles Educativos, Cuadernos de Pedagogía, Infancia y Aprendizaje. In the English language and with international importance we reviewed the following: Music Education Research International, Research and issues in Music Education, School Psychology International, Handbook of Research on Teacher Education, Journal of Technology and Teacher Education, British Journal of Music Education, Journal of Research in Music Education, International Journal of Music Education. The databases we accessed are as follows: ERIC, DIALOG, DIALNET, ISOC, TESEO and EURYDICE. Moreover, we have consulted the international communications and papers presented at ISME, International Society for Music Education, and MERYC, European Network for Music Educators and Researchers of Young Children. We also analyzed the studies in E-Journal and proceedings of IARTEM (International Association for Research on Textbooks and Educational Media).

RESULTS

The review of the research on music materials and textbooks has been structured as follows, bearing in mind the different lines of research detected:

a)   Curricular point of the music material and its impact on political discourse.

The development of collaborative work is another aspect of the role and influence of materials on teaching. López (2007) indicates the need to establish mechanisms designed to increase the time dedicated to music in preschool stage because teachers tend to prioritize contents depending on their initial training or specialty. Another study on teacher professional development in music education concludes that the construction of a specialist model is made difficult by the poor music edu-

cation received during school (Ocaña 2006). This aspect prevents having learned a musical model upon which to build professional practice. Thus, the importance of lifelong learning as a process of specialization and professional development.

Furthermore, we note that the biggest problem that teachers face is the lack of training in the knowledge of music materials (Vicente 2010). Johanson (2008) reveals that one of the fears of novice teachers involves the acquisition and organization of music learning materials and resources (scores, sheet music, method books, etc...). The situation in primary school is similar (López 2017).

The Lisbon Strategy (2000) has been shaping a common European educational policy in education and training. Each country follows the European teachers' education in a common line through the Bologna process. Within the "Europe 2020" framework of European cooperation in education and training, the objective is to ensure the personal, social and professional fulfillment of all citizens.

With regard to materials, the 2013 Spanish report on the European educational strategy regarding preschool education proposes full enrollment at the age of four, because it provides equitable education and enables better results in later stages of education.

Like many neighboring countries, Spain is currently immersed in the application of educational technology in the classroom, and great efforts are being made to integrate them into schools and preschools. Yet, analysis of research shows that educational policies pay little attention to the analysis of teaching materials (Montreal, Giráldez & Gutiérrez 2015).

The university reforms carried out by the Bologna process, have led to reflection on music education and materials, also in preschool. In the absence of a specialist teacher, music teaching relies heavily on the qualities of generalist teachers and their own concerns, limiting music education to audition and music literature.

In Spain, over the past 25 years there have been important educational reforms and resulting changes in teaching materials. Given the differences in each country, we identify three types of teacher with a diverse musical background who carry out their educational activity in preschool education: preschool educators, general educators with music knowledge and music specialists (Rodríguez & Vicente 2015). During this period, the first specific textbooks for music appeared, including preschool specific complementary printed material which accompanies the globalized project. In conditions of continuous changes, publishers compete by differentiating material insofar as formal aspects and adaption to the current curriculum, both in terms of technology and methodology.

These aspects do not always meet educational and pedagogical standards of quality, because of the business need to put resources on the educational market as soon possible. Furthermore, published material is usually in the spotlight; while

little attention is given to the quality of materials prepared by teachers tehmselves. Publishers contrast materials, check and test the resources before they launch them onto the market. Consequently, teachers need to have the training required for the selection and use of didactic materials for music.

b)   Analysis of the materials in the different grades

We found two main lines of work. On the one hand, those who consider that textbooks limit and oppress teaching, and on the other hand, those who understand that textbooks can guide and focus the work of teaching.

The power relationship established between the publisher, the curriculum and the teacher is evident, although preschool is characterized by an open and flexible curriculum based on the significance of learning. Teachers should have adequate knowledge to develop learning through music and the implementation of tasks that contribute to student understanding. At the same time, teachers must choose the degree of power that materials will have.

In this regard, some scholars consider that published materials imply a sub-ordination of teachers to the teaching project of those materials (Martínez 2004; López 2007).

Specifically, curricula address music as a key aspect of individual development from birth and various studies show its benefits (Bernal 2000), however the materials published for preschool stage do not implement this aspect sufficiently. Capdevila (2008) carried out an observational study on the musical behavior of children aged 0-3 years. This study highlights the importance of the material used in the intervention: e.g. music and sound recordings, musical instruments or sound objects, etc...

In this sense, the choice of material is set according to the objective sought and the sound quality of the material itself. These materials must be diverse and varied, rich in shapes, touch, colours and sounds. Furthermore, the place where children experience the music is important.

Teachers are often given the freedom to choose educational and music materials, but their options are hindered by a limited knowledge of music and the development of curricular contents. In addition, cost restrictions can limit educational development to what is included by publishers in packs of printed material for preschool. In particular, music education materials for preschool are limited to certain listening and easy execution exercises that may not even require the use of musical instruments. Some studies suggest the need to specifically develop music materials for preschool education, thus enhancing the independent work of future teachers and building the pedagogical foundations of their practice. (Arús 2010).

In preschool education, there are varied studies on materials for making music (Pérez 2010) and the use of music associated with movement, improvisation (Arús 2010) and creativity development (Cruces 2009; Soto 2013). In any case, there are still few studies on the use of the published materials or their effects on teacher professional development. Vicente (2011) showed that the use of published materials (textbooks and teaching guides) is greater in those with less training in music. This study revealed that the limited training in music or musical instruments and the high number of children per class contribute to the use of published and finished materials. Therefore, teachers run the risk of using them uncritically in the absence of the necessary musical knowledge for proper resource assessment.

The role of women in music education is often studied (Loizaga 2005). In this field countervailing research has been carried out in order to fill the gaps generated from the traditional androcentric perspective. This research involves a rereading of historiography of music education in the hopes of removing the old discourse and proposing new methodological procedures. Research on teaching and learning processes has originated a line related to Emancipatory Pedagogy, which requires individual teacher involvement. There has also been research on role and identity construction. The different studies analyse the presence of music and its use in texts (López 2017). There are not many studies that specifically address the issue of music education in preschool. Most of them try to analyze how certain contents are presented (related to folklore, creativity, movement, etc...). Most studies show the possibilities of musical development from different perspectives (movement, creativity, materials) in early childhood (Malagarriga 2002; Sharp 2003; Gauthier 2004; López 2007; Pérez 2010).

In addition, there has been research on the study of music and civic education and society. There are studies on the relationship between music and the media and studies on the music in children's programming on public and private television. These studies relate children's auditory development to the type of compositions heard during programming. They conclude that this music is biased, dominated by American musical styles with musical aesthetics very similar to those in Lucas and Disney productions (Porta 1998; 2001).

Some publishers are committed to including traditional and popular children's music in their textbooks; others do so in a residual manner. In this sense, the use of folklore as school sound material is improving and most schools use it. This is the result of material published as a textbook. Currently, many teachers use some piece of this type during the school year (Vicente 2011).

c)   Elaboration and experimentation of different didactic and music materials.

Music education pays attention to creativity, and the ability of teachers to improvise during teaching sessions (Arús 2013). These studies reflect interest in developing educational programmes regarding teaching methodology, procedures and

the evaluation of tools. In many cases, the purpose is to produce rigorous materials for building teacher autonomous and reinforcing the foundations of their practice.

Numerous programmes (workshops) exist to develop awareness of training processes to teach music in early childhood education. Camacho & Durán (2006) point out that the formulation of the problem in such studies is the type of material to design for the development of children's intellectual and artistic capabilities. The analysis of content has been studied by researchers such as Vicente, G. & Azorín, C. M. (2013) who analyse the value of song lyrics in relation to identity. Other researchers (Lopez, 2017) analyse the didactics of music with each school material.

Studies focusing on proposals for musical intervention in preschool have a wide appeal. They highlight learning materials studies: Malagarriga (2002), Rusinek (2004), Gustems (2003), Oriol (2004), Romero (2003), Guillanders, (2010). However, the musical training of teachers is limited, especially in preschool.

FINAL THOUGHTS

Throughout this text we have tried to present some of the most relevant studies on music and teaching materials in preschool education In Spain. We have structured the contents around three aspects.

The knowledge, use and evaluation of teaching and music materials is directly related to teacher training. The lack of musical training regarding music education for young children is widespread. The type of material used in music is conditioned by teachers' professionalism insofar as materials selection.

Research shows concern for music education in regular classrooms, student ratio, as well as quantity and quality of materials. The possibility of continuous training for teachers is also an area of study.

Numerous studies focus on movement and creativity as activities for musical development among young children. Everyone agrees on the importance of extensive and valuable areas in terms of sound resources.

In conclusion, the attention by Spanish researchers demonstrates that the spotlight has been placed on music materials.

There is still a long way to go. In this field, research is not very significant and the companies involved in the development of didactic materials do not seem to progress towards real change in musical methodologies. We need to understand materials better in order to use them in a way that changes music education.

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MULTIDIMENSIONALITY OF CONTENTS PRESENTED IN TEXTBOOKS [1]

VÂNIA FERREIRA & MARÍA-CARMEN RICOY

With the exception of pre-school and university education, the textbook is the most historically used didactic resource for most teachers and students. Besides the generic pedagogical problems and the social and political obstacles that this type of resource contains, the textbook include several problems and possibilities, which are addressed in this work. It is a fact that textbooks support a multiplicity of contents so they should be a stimulating and rich resource, both by the previous ones and the development of strategies and resources that help students improve their school success. The central objective of this study is to discover the multidimensionality of contents present in the Music Education textbooks, of the 3rd cycle of Portuguese basic education. In this qualitative study, the document analysis technique was used, being considered three broad categories: image, sound and text. The main conclusions show that textbooks predominantly present images compared to text and sound, among which the most frequent are graphic organizers. Also, the songs presented on textbooks although varied in style and genre are notoriously traditional, framed in the context of the own country (Portugal). It should be noted that there is a lack of inter and multicultural variety of sound tracks present in textbooks.

INTRODUCTION

Nowadays society is going through a period where technological modernity is marked by music and images, and where musical and audiovisual productions are accessible to all (Yarbro, McKnight, Elliott, Kurz & Wardlow 2016). All teaching and learning processes result from the need to teach students the ability to master the languages of symbolic representation and access different sources of information: textual, sound or audiovisual. This is justified since the multiplicity of sensory stimuli (resulting from the simultaneous and varied use of different didactic materials, together with different activities that allow working diverse symbolic modalities) translates into a principle of effective performance in the teaching and learning system and which should be permanent in the school context. However, in many countries little attention is paid to textbooks, neglecting the potential and weaknesses of these resources and other alternative educational resources (Aamotsbakken 2007).

The textbooks are part of a teaching system, which is not only limited to Portugal but is international. They are a marked part of knowledge, in which experts and researchers play a major role in the creation and dissemination of this knowledge (Altbach 1991). However, there are different ways to use them in the classroom: using the textbook as a curriculum; combining textbooks with other materials; and the replacement of the textbooks by other materials. It is a fact that the diversity of practices in use textbooks depends essentially on the type of social actor (Choppin 2007).

As has been said previously, in order to think about education it is required reflect (not only, but also) on textbooks. We must ensure on a methodology for the didactic analysis of this type of educational resource, since there is a diversity of possible postures to examine it. Analyzing textbooks involves different approaches: technical-empirical (physical characteristics, illustrations, content, organization, didactic strategies); theoretical-practical (interaction between the environment and the subjects; and political because it relates the materials to the curriculum and context (García Pascual 2004).

Discussion aboard the contents of textbooks should be paid attention to: scientific value; accuracy and clarity of the concepts used in the texts; timeliness of the presented data; contents structural and logical organization; as well as the volume and quality of the facilitating elements for assimilation by parts of the most difficult concepts (Gutiérrez-Cordero & Cansino 2001). In this sense, any proposal to value a textbook should also take into account the adequacy of the language, the scientific and didactic validity, the illustrations of the texts, and the treatment of information (Martínez Bonafé 2008).

In fact, everyday students and teachers have access to a wide range of information sources, obtaining multiple contents from various media and resources (Order 2015). However, the widespread use of the printed textbook has prioritized the in-depth study on content, in this specific case on the context of Music Education. The textbook can be a good tool to prepare a great pedagogy. Its function is to homogenize culture and reduce the disconnected fragments of subject knowledge. The effectiveness he plays in school can be similar to that of a lifeline, a question raised by Martínez Bonafé and according to which it is worth thinking about what role the textbooks actually plays.

There are multiple factors that converge in textbooks and interact in different ways: the contents of a subject, pedagogy, curriculum referents, ideological elements, language, and graphic design, among others. The potential of textbooks resembles those of musical instruments when played by a virtuos or ordinary person: the results are clearly and significantly different. Mejía Botero (2007) says that it is essential to make a balance between the instrument (textbook) and its interpreter (the teacher).

In the field of Music Education there is a diversity of resources. The ambivalence of means implies diverse and different functions. Most of the authors who have thoroughly dealt with the theme of resource functions: identify the purpose of motivation and stimulation; making the teaching and learning process more flexible; training; helping to build and consolidate learning; evaluation; development of reasoning and research; development of the interaction and active participation of the student in his or her learning.

For educational intervention there are multiple resources that contribute to simplify the process of teaching and learning. This multiplicity is justified since it is considered as subject of education: the student, his interests and his personality. In the case of Music Education, the possibility of living and understanding music through pleasant, socializing and simultaneously playful experiences, integrated in a globalized perspective (including psychomotor, social, affective and cognitive development) does not necessarily require a multitude of resources. One can contribute to a harmonious development of the students personality, their balance and their satisfaction through several situations experienced where they can simply be interpreters, using only as a resource their own voice, for example. However, they can also be active listeners, using a CD to provide that experience, a CD player and its speakers or simply a radio. In the same way you can provide a wide range of stimuli and activities that allow you to discover music, living, enjoying, creating, drawing, playing, dancing, exploring, thinking and feeling musically.

Advertising and the marketing industry uses and abuses music, transforming several TV moments into an mixture of auditions that are made available to all viewers, thus building part of their musical experience. Along with culture, the environment, the personal and family background and education itself, it profoundly influences the learning of music.

Despite challenging with other didactic resources derived from the new technologies applied to teaching, textbooks continue to command class planning activities for most teachers. This is a valid reality for this research and it refers to a central issue: the promotion of good educational practices. This conduct in the teaching of music is fundamental for a teacher of excellence (Malbrán 2011) and makes teachers aware of their inadequate training to understand the content of textbooks and to realize the impact that this resource can have on the construction of students' knowledge, identity and citizenship.

Hickman & Porfilio (2012) suggest that educators and textbook researchers should be vigilant about how political, social and cultural issues are exposed in their content. They feel the lack of knowledge about how textbooks are being used in the new political times, since it is they who define what knowledge and in what form is considered the most valued. The textbooks are complex objects and are places of expression of a multiplicity of relationships that can be trans-

lated into a multiplicity of contents. Creating a stimulating and rich educational context is everyone's occupation including the authors of the textbooks, making them enriched at times and rich in songs of different styles and genres, in different dances, musical instruments and diversified contents. But does this correspond to reality?

LITERATURE REVISION

Musical development directly influences learning (Lamont & Hargreaves 2008). Benefit musical development involves working the musical intelligence, through the increase of some tasks that allow exploring well defined and concrete musical abilities. However, for musical learning it is also necessary to explore the other multiple intelligences, as well as the combination of distinct intelligences (such as mathematical intelligences, bodily intelligence, kinesthetic intelligence, and spatial intelligence). In order to stimulate multiple aptitudes, the contents presented in the textbooks should be equally multiple, varied and diverse. Perales Palacios (2006) presents the analysis of textbooks divided essentially into two major sections: on the one hand the formal characteristics and on the other the characteristics of content. By focusing on the characteristics of content, it is possible to subdivide the content analysis in terms of its (scientific or pedagogical) nature and its format (verbal, visual).

In the 21st century, educating for the musical language forces a transformation of methodological approach (Hargreaves, Hargreaves & North 2012) because music reflects the change of society, the social, cultural and technological changes resulting from globalization. It is essential that the students are aware of and assimilate all the transformations (Flores 2010). In this sense it is relevant that some special care is given to the images, especially by the potential interaction between them and the music (Alcalde 2008), considering them as an essential element (in addition to music) which one should teach students to interpret them (Cantón 2009).

Textbooks and their contents (images, text, but also sound) should be inspiring to facilitate the student in their learning, adapting to their basic interests, abilities and expectations. This circumstance is hard to achieve because many of the school contents refer almost always to various population groups. It should be remembered that everything around the textbooks is complex: elaboration, editing, marketing, use by both teachers and students (Pérez González 2012). This author argues that all the complexity inherent in the subject of textbooks stems from the great diversity of interests (political, governmental, ideological, different groups, pressure groups, economic groups, authors and publishers) and objectives (teaching and training - pupils and teachers). Textbooks, as distinct social and cultural artefacts, play the role of production and reproduction of social and cultural

significance within society. This approach allows a reflection on research, making it not only academic, but also an efficient discourse of the production, alteration and receptivity of textbooks (Otto 2012).

According Rodríguez Diéguez (1983) the language present in the textbooks should include three areas: verbal language; iconic language; and the interaction between the both. The latter is analyzed through behavior, calling both as the twin daughters of sound. However, the possibilities for social actors in schools to make substantial changes in the quality of school texts are rare (Carbone 2001). As one of the aspects that stop up most time in the everyday pedagogical practice of Music Education, it makes perfect sense to pay attention to it.

However, this much more decisive role in the case of teachers also manifests itself to students. Understanding the synergy between the visual and the writing is something pertinent and that already Umberto Eco in 1994 mentioned. Both written and spoken languages are important for education. However, audiovisual media require new forms of expression, in which words must be the direct expression of images. Though, these should be clearly chosen to illustrate words and increase understanding by those who read. This means that when it is essential to mediate knowledge, it is necessary for the individual to interpret and translate the contents analyzed into audiovisual material that may be relevant to the figures: precise and expressive. The images should illustrate the words and the words should be able to explain the images (Kjell 1995).

It is a fact that information is better learned when accompanied by images, and these can be classified according to their relevance for placement textbooks: photographs, realistic drawings and drawings with a high degree of abstraction (such as schemes). When using images, it should be taken into account that: your choice should be smart, demonstrating its usefulness to students of a certain school level; understanding the images can be facilitated by the presentation of familiar objects; the illustration of a method must contain as many images as the phases of this method; in the case of drawings, these should be as realistic as possible; attention to the use of images that imply symbolic interpretations instead of literals; with schooling, it is easier to understand the illustrations, and they should be adapted to the level of education; and the reader's age reveals his ability to comprehend visual symbols (Richaudeau 1981). Torres Santomé (2008) warns of the danger of *waltdisneyzation*, a caricature used to define the predisposition of many textbooks to resort to a kind of infantilization using images similar to those of the cartoon series on television.

The importance of each textbook is directly related to the subject, course and didactic unit of a particular school group so that the students know the goals they have to achieve, working with a source of motivational work. Its contents must be of several authors, publishers and illustrators in order to be objective, flexible

and operational, expressed through concrete forms of application. Already in 1979 Richaudeau had exposed five different ways of presenting the same image (color, black and white photography, color drawing, color scheme and black and white scheme), explaining for each type of image the advantages and disadvantages of each one of them. Broadly speaking, color photography images deliver more affection, but are less financially advantageous, as opposed to black-and-white schemes that are able to achieve the transmission of feelings to a lesser extent, showing clearly and more economical. This author also presents advantages and disadvantages of each type of image (photography, drawing or scheme) that correspond to different ways of transferring information: his affective force, the type of information (clearly and precisely, as well as his wealth) or the financial benefits (for the few expenses of printing).

The illustrations in the textbooks: should be in accordance with a specific pedagogical project; the image must have a direct relation with the subject addressed; the matching elements between image and text will not be interpreted at the same time by the reader, so they must be defined in terms of placement on the page taking into account the pedagogical order and the hierarchy of the concepts presented; the images must be organized according to a logical sequence; the illustration should have the function of drawing attention to the theme to be addressed; the illustration may serve as a complement to the understanding of the information written in the text; should have the size and use of appropriate colors to arouse interest; never ignore that the images themselves have an aesthetic function, and should not function as distracting elements (Richaudeau, 1981).

Besides being interesting to make textbooks aesthetically attractive, the illustrations provide information, frequently clarifying the contents of the text. The goal is to respond to the training needs of the future citizens, not only by changing the paper-based textbook from the digital textbook, but also by providing them with other vital training experiences that help them solve everyday problems. Visual support can contribute to an effective contribution to learning in six essential situations:

- Clarify or understand the incomprehensible (in complex situations or abstract ideas);

- Describe processes or show relationships between elements;

- Observe how others act and behave;

- Graphically represent numerical data to reach the greatest number of people;

- Reinforcing information;

- Increase concentration to keep interest and motivation on a topic (Medrano Basanta 1998).

Images, through the emotions they raise, through the stimuli they create and the simplifications they lead to, provide meaningful learning (Pró 2003) confirming the popular proverb that a picture is worth than a thousand words. However, it is not all images that serve reality. It is up to the authors who select them to define the role that they will accomplish, which end up using reality as object and with the purpose of expressing in the best way what it is intended to clarify students. With regard to the formal aspects, the images must comply with the following assumptions: form of presentation; size; relationship of the image with the text; position, color and space. Regarding the type of presentation, in the textbooks, the images are separated from the text written by a mark, that is, they are the images with outline, or without any separation of the same from the images without outline (Amador & Carneiro 1999).

Contemporary society is marked by images. Music and audiovisual productions have become easily accessible to all through television, computers, telephones, and mobile phones, Ipods, among others. Nodaway's students have access to recorded music very easily: they create web space, compose, record and share their own music; make videos and animations; create blogs and instant messaging / communication networks; live on social networks; produce and distribute music, alone or in groups, over the Internet; they digitize, transform and combine images and sounds (Giráldez 2010b). The actual society develops within an image society, which guides it in economic and political terms, functioning as a fundamental support to the survival of the first one. The mass and sometimes indiscriminate diffusion of images through the means of communication is directly associated with the desire, the way of seeing and understanding, of establishing relationships, of customs so much that there is a uniformity of conceptual and vital aspects, this function safe by the images that guide human thought and life (Infantes 2007).

There is also an important aspect that is the promotion of multiple links that make possible the reinforcement of the binomial art and technology. These are a requirement because the use and function of the arts in education and human development are crucial (Giráldez 2010a). Although the new technologies allow the development of the constructivist pedagogical model its use involves advantages and disadvantages in the central role to generate knowledge (Gérard 2008).

It is important to reflect on what it means to teach music in the digital and urban age (Fitzpatrick-Harnish, 2015). It is not enough to introduce the technological devices in the classroom to be innovative because there is also a prerequisite to improve or create alternative textbooks to promote music teaching (Finney & Burnard, 2010). In place of this, it is imperative to define the functions and purposes of ICT in the teaching and learning process, as well as to understand the profile of students and their needs. It is also important to reflect on the relationship between technology and music as well as musical experience by focusing on how ICT can function effectively and play a role as a creative musical learning instrument (Pérez Gil 2007).

In another order of questions, it is necessary to understand that the technological equipment in the music classes is elementary for the integration of the equipment in the classrooms dynamics, and that it is obligatory the teachers to recognize their potentialities. It is also essential that the textbooks allow the development of digital skills (knowing how to search for information by selecting the most relevant one, working collaboratively by sharing and publishing information online) in a simultaneous and balanced way between the two main actors in the classroom: teachers and students. Digital learning within Music Education can be immeasurable since the content and potential of the Internet are almost unlimited, providing a vast, alternative and creative language (Moya, Hernández, Hernández & Cózar 2014).

According to the hegemony of the topic described, the main purpose of this study is to analyze and know the multiplicity of contents that are presented in textbooks, in particular on Music Education in the 3rd cycle, of Portuguese basic education. To address the global objective the following specifics were employed:

- Identify in the textbooks the different types of content they present.
- Determine which musical styles and genres are presented, both in scores and textbooks CDs.

METHODOLOGY

The present research is part of a broad study followed by a bimetodic, quantitative-qualitative approach and a triple perspective for data collection (involving teachers, students and document analysis). Being certain that the whole investigation cannot be presented in this study only one part was selected for this contribution. This follows a qualitative methodology, through the narrative investigation with the analysis of documents that are the Music Education textbooks, of the 3rd cycle of basic education, currently marketed in Portugal.

The main goal of this study is to discover the multidimensionality of contents present in Music Education textbooks for the 3rd cycle of Portuguese basic education. In the particular case of the *corpus* from the four analyzed textbooks it is tried to find out if these include musical contents of different styles and sorts, among other relevant aspects, in particular those related to the TIC. In this qualitative study, the document analysis technique was used, being considered in its content analysis three great dimensions: image, sound and text. The observation and consideration of the content presuppose the creation of a matrix of categories and subcategories, on which the researcher concentrates the contents analysis expressed in its object of study. Content analysis, as a set of communication analysis techniques, allows us to divulge the implicit axiology in textbooks. The defined categories in this study are like compartments where certain elements of meaning that are integral in to the message (Bardin 2009). In this investigation the meth-

odology of content analysis was used using the technique of the category system, a process of categorization from the grouping of message elements with common characteristics that allow an objective data reading. The data documentation process includes two steps: the data collection contained in the textbooks, followed by its treatment by means of the creation of an organizing categorization system that explains the interpretive procedures.

Since Music Education is considered a practical subject, it is assumed that its textbooks must also be practical, both at the organization level and its contents presentation. The interrelation of these three main components (image, sound and text) is part of all textbooks, including those of this theme. Cabral (2005) considered three levels of textbooks analysis: text, activities and images. Inspired by this author and in substitution of the activities group in the case of Music Education, it was decided to consider the sound category, integrating written activities in the text category and the activities of reading scores in the iconic component (specifically in graphic organizers). Based on these assumptions, in this study can be said that the field of research incorporates three main primary categories: image, sound and text, so the textbooks are analyzed in three stages. The analysis proposed in this research has a greater incidence in the most practical components: sound and image, being the texts analyzed only in relation to superficial aspects of organization and specifically inserted information. Opportunely in a future research the text will be worked out in more depth.

Contextual approach

As a contextualization procedure, it is important to refer that the Portuguese education system includes four levels: pre-school (children aged three to five); Basic education (children from six to fifteen); Secondary education (young people aged fifteen to eighteen); and Higher education (young people from the age of eighteen forward). In turn, the basic education curriculum in Portugal (the one in which this research is focused) is divided into three cycles:

- *1st cycle* - Four curricular years (1st, 2nd, 3rd and 4th grade – children from six to nine).

- *2nd cycle* - Two curricular years (5th and 6th grade - children from ten to twelve).

- *3rd cycle* - Three curricular years (7th, 8th and 9th grade- children from twelve to fifteen).

Musical Education of the 3rd cycle appears as Artistic Education in basic education. It is separated into four areas: Plastic Expression and Visual Education; Expression and Musical Education; Dramatic Expression / Theater; and Physical-Motor Expression / Dance. In each school, students are presented with different

optional artistic areas, with Music Education being one of those options competing with technological education, theater, cinema, among others.

The Portuguese legislation on textbooks is revised in 47/2006 Law, of August 28, which defines the system for the evaluation, certification and adoption of this type of resource and others. This law also presents the regulation of socio-educational supports that integrate the acquisition and loan of textbooks. Specifically in its 3rd article, it is mentioned that the textbooks is a significant didactic-pedagogical resource in the teaching and learning process, which serves as a support to the student's work and that proposes to contribute to the development of competences and learning defined in the national curriculum. The National Curriculum of Basic Education of 3rd cycle for Music Education is structured in eleven themes and around four organizers: Interpretation and communication; Creation and experimentation; Sound and musical perception; Musical cultures in contexts. For the four mentioned organizers, the textbooks show the development of a work interconnected from a thematic module, among the eleven that are part of the curricular guidelines: "Forms and structures" (Music organization and structuring), "Improvisations" (Exploration and understanding of the processes of musical improvisation), "Melodies and arrangements" (Forms of creation, composition and arrangement of melodies and songs), "Memories and traditions" (Exploration of different types of musical spectacles of national origin), "Music and movement" (Exploration, interpretation and creation of different types of music around the movement, dances and choreography), "Music and multimedia" (Exploration, understanding and manipulation of sound and musical materials for the production of communicational, aesthetic and others), "Music and technologies" (Manipulation of acoustic and electronic sounds through experimentation, creation, interpretation and exploration MIDI), "Music of the world" (Exploration, manipulation and understanding of codes and conventions of musical cultures of oral tradition), "Pop-Rock" (Identification, creation and manipulation of the characteristics of some musical styles through the use of technology), "Sounds and senses" (Exploration, manipulation and understanding of musical creation through experimentation, composition, interpretation and graphic representations of sound) and "Themes and variations" (Exploration and manipulation of a musical idea).

Although for most subjects curricular goals have been created, Musical Education of the 3rd cycle and secondary education continues to be guided by the eleven units that define the curriculum and corresponding abilities. Specifically in these textbooks the presented curricular contents can be worked transversally and continuously throughout the three years that make up the cycle of studies of the 7th, 8th and 9th curricular year. The approach to these curricular modules does not have to follow a pre-established order, with the content-chaining logic only subordinated to what is exposed by the textbooks and consequently through what is elected by the teacher to be developed in the music classroom.

Sample study

As already mentioned, the analysis presented in this paper included Music Education textbooks of the 3rd cycle of basic education in Portugal. In the approach of this study, the twelve textbooks edited from 2002 to 2016 were initially considered. In a later stage valuing practical questions, it focused only on the four textbooks that constitute the whole of those existing actually in the publishing market.

As a criterion for reducing the sample was considered the date of publication of the most recent textbooks, which are active in the publishing market, leaving out of the sample the textbooks that are no longer in commercialization.

Abbreviation	Level of education	Textbooks title - Publisher	Year of publication
1M	8th and 9th grade	*Fábrica dos Sons 8/9* – Porto Editora	2003
2M	7th, 8th and 9th grade	*Menu Musical* (new edition) – Porto Editora	2012
3M	7th and 8th grade	*MP3 7/8* (new edition) – Areal	2012
4M	7th, 8th and 9th grade	*MusicBox* – Raiz Editora	2012

Table 1. Sample of studied textbooks

Note: To simplify the presentation of the study sample, each textbook is identified by an abbreviation, according to the chronological order.

Source: Produced by the author.

The study sample includes these textbooks that are adapted to an age group of students ranging from 12 to 15 years. Regarding the sample, it is also important mentioning that a total of 498 pages were analyzed with the four textbooks. It is pertinent to present a synthetic description of the main characteristics of each textbooks that constituted the study sample:

- *Fábrica dos Sons 8/9* (M1) has a total of 96 pages (plus 32 specific for teacher use). It has guidelines for its use and location with the numbering of its pages in the upper zone and in the end. Cabral & Andrade (2003) presents as complementary material acetates and CD support.

- *Menu Musical* (M2) has a total number of 111 pages (same version for teacher and student) with soft cover and back cover on a spine with rings. Rocha & Ribeiro (2012) include index but, however, do not present guidelines for the textbook use. The pages position is in the bottom corner and the end. As a complementary material, it has a set of detachable scores (this material is also available in a URL), a music technology

project and audio CDs.

- *MP3 7/8* (M3) is composed by 144 pages. Cabral & Sarmento (2012) include a front cover, back cover, as well as a cover sheet. This textbooks has a list of listening's, video guides, index and spine glued, therefore without rings. It should be noted that the initial pages contain guidelines how use the textbooks. The pages location is at the external end. The textbook supplementary material is a CD-ROM.

- *MusicBox* (M4) covers 144 pages. Carneiro, Santos & Carlos (2012) have back as well as cover sheet and glossary. This textbook includes a position guide of the notes to play flute, a list of listening's, index and the spine is glued, without rings. The curricular modules of this textbook are distributed evenly. It is presented as supplementary material a daily notebook (for the student) and five audio CDs (for the teacher).

The four analyzed textbooks correspond to the printed didactic material that is currently being marketed by the publishers as main support material to the pedagogical practice of the Music Education subject. This corresponds to what is being "absorbed" by both students and teachers. It was decided that the textbooks to be considered in this study are those of the teachers as they are those that incorporate the student textbook in its wholeness and expect the aspects of interest both for teacher and student.

Data analysis

To the content analysis of the documents that constitute the textbooks the Nvivo 10.0 software was applied. Through this program all data (whether textual or iconic), once defined the categorization, and were materialized through different coding nodes. As an initial step, the textbooks were scanned in pdf format so that these documents could be analyzed with a selected program and considered appropriate for the qualitative analysis. It should be noted that for this investigation the total of the textbook *corpus* was included, containing three essential aspects:

- *2nd cycle* - Two curricular years (5th and 6th grade - children from ten to twelve).

- The main kinds of content presented.

- Sub-contents of each kind of main content.

- Genres and musical styles presented.

In this way, four priority analysis lines were created: the presented survey of the various textbooks contents; the sub-categorization of each major identified categories; and the recognition of included musical styles and genres.

RESULTS

In this section we present the obtained results in agreement with the presented research objectives in the current work. Figure 1 shows the three main types of content (or thematic unit) displayed in the analyzed textbooks: image, sound and text.
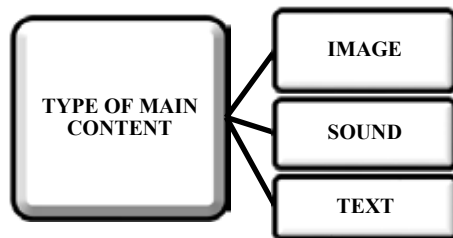

Figure 1. Main contents presented in the under review textbooks

Source: Prepared by the authors

The image is a thematic area shared into illustrations and graphic organizers. The sound, also divided into different categories, has as main objective to verify the presence of information congruent with Music Education and that indicates the presence of musical contents associated to CDs, the sound that accompanies the textbooks. In turn, the text as unit of analysis was created in the sense of accessing the information / communication made through the textual elements found in the Music Education textbooks.

Subsequently the construction of the thematic units, diverse categories and subcategories were created that allowed to analyze and to accede to the textbooks contents. These categories and subcategories differ according to the analyzed subject, functioning as a method of collecting visual, hearing or textual information with communication functions according to their receivers (students and teachers).

The image topic consists of two main categories: illustrations and graphic organizers. Each of them is made up of distinct subcategories, which allow not only to collect the information associated with each category, but also to characterize in content terms the Music Education textbooks illustrations according to specific points that function as a method of information selection to be collected.

The graphic organizers can be understood as the tools present in a textbook with the purpose of ordering the contents, ideas, activities and tasks, in order to facilitate the acquisition of knowledge. One of its main functions is to simplify the presentation of content and to represent it, so that it promotes the critical thinking of the one who use them. The graphic organizers contemplated in the analyzed Music Education textbooks were all those that are considered elementary to assist the process of learning to the students and the process of teaching by the teachers.

Thus, we tried to identify in the textbooks the presence of diagrams, maps, graphs, music graphics, scores, tables, tables and indicators.

With regard to graphic organizers scores, these are also distributed into distinct subcategories that allow for an exhaustive contents analysis of the guidelines presented in the Music Education textbooks. These are the indications of the heading score, its musical style, the description of different components (such as key note, tone, compass, beat, scope, dynamics, rhythm figures, type of composition, among others).

The scores may be representative of different musical styles (regardless of whether the style is identified or not in the heading), which makes it essential to identify which ones are manifested in higher numbers in the Music Education textbooks. The styles range from rock, to soundtrack, musicals, reggae, samba, or even hip-hop, pop, traditional music and erudite music, among others.

The subcategory illustrations, as far as content was divided into four elements of analysis: people, objects, animals and landscapes. The category aims to present the illustrations content present in the analyzed textbooks. As landscapes are considered all images that contain people (there are some situations where there are animals present with people, people to use certain objects and with a certain landscape as a backdrop.) However, all these images are counted only as images of people, not being counted in the remaining subcategories). Images of objects, animals and landscapes are those that present only objects, animals or landscapes. The subcategory seeks to collect information about people's illustrations on five central points: gender, type of grouping, age, world region and social class.

The objects subcategory was created to identify objects that are presented in isolation, which not contained people simultaneously. Taking into account that these are Music Education textbooks will be expected to identify the presence of numerous musical objects, since they are related to the subject matter.

Regarding the objects content, two categorization items were created: musical objects and non-musical objects. Within the group of musical objects were considered the musical instruments and other artistic objects. For each instrument it was recorded the world region to which it belongs (Europe, Asia, Africa, America or Oceania), its classification (aerophone, chordophone, membranophone, idiophone or electrophone).

The type of illustration is divided into six subcategories: image capture; its assembly; coloring; type of angle; type of plane; and type of implied space. Each subcategory is divided in several lines of analysis and codification of the data illustrations. So the image capture considered was by photography or drawing. The technique of assembling the observed photograph was with effects (image overlap, watermark, alteration of the original colors) or without effects. The type of coloration

described was polychromatic or dichromatic (in this aspect it was considered the combination of colors black and white, black and other color, white and other color, two other colors than black and white). The angle analyzed was frontal and oblique, while the type of plane observed was the big general plane, the general plane, the American plane, the middle plane, the foreground, the detail plane, and the first very first detail. Was considered the space shown in the figures, as open spaces (urban, rural, natural, monuments) or closed spaces (concert hall / stage, recording studio, room / room), unidentifiable space or mix of spaces and closed, as an example.

Thematic unit of hearings has the purpose of characterizing the Music Education textbooks in relation to the sound contents identified and present in them. The hearings made available for use in the classroom by teachers and students and even at home. The sound itself was not only audibly analyzed, but also in a written form and based on the list of sound examples and other resources complementary to the Music Education textbooks. In this sense, six categories of analysis are considered: resources; length in seconds; composer; interpreter; music style; and world region of hearings.

Among the main musical styles present in the hearings examples found in the CDs accompanying the textbooks under study are the following: Rock and roll, Rock, Surf rock, Alternative rock, Pop rock, Rock opera, Pop, Hip hop, Opera, Erudite, Musicals, Soundtracks, Jingles, Christmas Music, Light Music, Disco, Country, Gospel, Fado, Jazz, Blues, Soul, Black Spiritual, Tcha-cha-cha, Kizomba, Samba, Ragtime, Reggae.

The songs collected by textbooks, although varied in style and genre, are notoriously traditional, framed in the Portuguese context, which highlights a lack of inter and multicultural diversity of hearings present in textbooks.

The text is presented as the last thematic unit of the Music Education content analysis and, as its name specifies, concentrates its attention in the contents analysis presented in written form, the illustrations and the hearings are not considered here. Although the concept of presentation-related design is highly personal and subjective, there are issues that can be addressed such as: whether titles and subheadings facilitate navigation in the textbook; whether the level of language is appropriate for students; if there is a balance between text and illustrations; if the illustrations clarify the text by giving relevance directly to the developing content or if they are merely decorative.

It was pertinent to analyze the text thematic unit in terms of its organization and the presented contents, creating two new categories of analysis: organization and contents. For the organization of the text it was considered the graphic aspects and the complementary educational resources in a group of macro analysis. Activity indicators were observed as well as the activities themselves in a group of mesoanalysis. Captions and footnotes were considered in the text microanalysis.

The content was analyzed on the one hand the curriculum in its component of organizing modules and analyzed the content in its subcategories attitudinal, conceptual and procedural.

DISCUSSION AND CONCLUSIONS

The main conclusions of this study point out the existence of a multidimensionality of contents in the analyzed textbooks and that certainly, can be transported to other Music Education textbooks and even of other artistic subjects. It should be pointed out that school textbooks predominantly present images in relation to sound and text, with the most frequent being graphic organizers. Also, the songs collected by textbooks although varied in style and genre are notoriously traditional, framed in the context of the own country (Portugal). It should be noted that there is a lack of inter and multicultural variety of auditions present in school textbooks. In general, the activities and resources collected in the textbooks do not foster diversity for musical analysis and exploration.

There is clearly a pedagogical overvaluation of hearings (where ICT is used only as a simple warehouse of audio content) to the detriment of other activities or pedagogical purposes. According to Ferreira & Ricoy (2017) Music Education textbooks does not promote sufficiently the use of ICT. In turn, with this study, also as indicated by Ricoy & Feliz (2016), it is confirmed that in a generalized way the technological tools are not yet being included in a standard way for any level of study.

It should be noted that for the work of students with Special Educational Needs (SEN) the educational and imaging educational resources are the most important in leading various activities to teach concepts in music (Whipplee & Van-Weelden, 2012). Audiovisual media that are missing from the analyzed textbooks have the possibility of combining sound and image, which is clearly an advantage over printed textbooks. The image, on the one hand, has communicative and didactic functions in the field of motivation, information, active explanation and complementarity. The relation of the images to the main text can be connotative, denotative, synoptic (varying with the type of legend - without caption, nominative, relational) and also with its functionality (inoperative, elementary and syntactic) (Díaz & Pandiella 2007). In turn, video as an audiovisual media has the functions of motivation and support, substitution, interaction, self-knowledge and self-expression, video games and teacher training. It is in this sense that it is suggested that these elements become more representative in the textbooks complementary materials.

It may actually be more valued a good picture presented in a textbook (which can be presented to students on the big screen in the classroom) than a page full of text. This communication through image can be more effective and powerful

in the impact to create in student learning because it is a more favorable means of communication, which encourages motivation (allowing the combination of stimuli, either by moving image or sound) and in the approach to reality (for revealing situations similar to real experiences). Thus, the textbook can modify the motivation of students against any subject. However, their graphic or aesthetic presentation is not appropriate to ensure effective learning. It is necessary to think in a material organization of the textbook according to the students' goals, considering their age, interests, aims, and their own involvement in the learning process, so as not to risk demotivating students who are less committed to the instruction (Bergmann 2007).

The images present in the textbooks are of the type: maps, graphs; characters, symbols, scenes, landscapes, models, line drawings, schematic drawings, works of art, whose functions are motivating, replacing text, catalyzing experiences, informing, explaining, not forgetting their aesthetic function. As with textbooks, teaching resources also serve to communicate and must accomplish certain functions as a means of communication for the masses: to be representative; allusive; to enunciate; allocate and operationalize (Luengo & Blázquez 2004). In relation to the use of drawings on the textbooks must take into account the student reaction to the presentation of the material, for exemple the methodological issues of materials. In order to have a fluid and active relationship between the curricular activity, it is important that there is students motivation for the texts and this is achieved through creativity, personalization of information, addressing aspects of globalization (Wolton 2004) making use of a linguistic code and illustration of the fascinating texts along with the fantastic external aspects.

Young people's free time is spent going to and from school and in other activities such as: doing sports, watching television, playing games, surfing the Internet, doing homework, studying, and so on. But listening to music comes first, and the Pop genre being the one that most occupies them attention. For this reason school should start from this musical genre to develop young people's knowledge about music. In fact, the informal learning of music happens in any community where there is melody, rhythm and harmony. This teaching may be basic, through natural and spontaneous responses, or more focused on the experiences and opportunities that occur in everyday life. This is an informal education that is commanded by young students, with no barriers to learning (D'Amore 2010) being a new pedagogy to apply in the classroom (Green 2009) along with the formal education that is taught by adults in schools and colleges (the respective teachers of the discipline). It is moreover relevant that non-formal education controlled by adults in community settings, as all three types should be represented in the textbooks.

Learning, within a constructivist and meaningful perspective, defines that texts from textbooks should foster reflection on experiences, observations of reality and experimentation through the achievement of certain objectives. Thus,

there must be a scientific and pedagogical adaptation of textbooks contents so that they work as a source of stimulation for the students (Rosales-López 2009). To improve the text, one has to bet on the creativity of the same that can be found in the type of activity that this proposes to carry out. The text has to be customized and this customization concerns the text ability to promote individualized teaching (Gutiérrez-Cordero & Cansino 2001).

The treatment of sound presents a sequence of constraints that must be considered, and the main one is the lack of knowledge of this specific language, which produces demotivation and attention problems in students. Stimuli are understood as an essential part of learning that allows students to acquire behaviors that enable them to reach their full potential (O'Neill & McPherson 2007). It is up to the teacher to use, for example, various visual objects; cards with flute positions; moral ordered with the History of Music with images of composers, facts and other data; students drawings inside the symphony orchestra and its instruments; cards with musical rhythms may be some alternative strategies (Moya, Hernández & Hernández 2010). Parallel to the motivation we must see the music teaching as something global suggesting the need to contemplate changes in what concerns its teaching, especially modify what the students feel inwardly. The hidden curriculum of the music teaching is present in the unconscious, containing in itself emotions and sensations that allow the development of mental images.

Certainly students and teachers would be pleased to see that the textbook they work with reflects news from television, advertising music, science fiction books, movie soundtracks recently released on film, as well as top sales successes and some investigations to solve some problems in the specific musical range. Also contents those were interesting and important to the students. In this sense Duarte (2012) questions about whether textbooks can contribute to a different school? The answer is clearly positive, however, there has to be an opportunity to create new textbooks where these are included and where the textbook potentiate the inversion of a transmissivity methodology characteristic of a predominantly verbalize and demotivating teaching.

The fact that the textbooks are impregnated with images allows the students to have a closer approximation of reality and a more intuitive way of learning to read the information that is intended to be transmitted. It is extraordinary that each school and each teacher contextualize their use in order to the characteristics of their group / student. The graphic language plays a didactic function of contents communication, learnings activation and student motivation. Through the images and graphical representations exemplify different realities, allowing planning activities and exercises to be solved by the student. This didactic function is developed along with verbal language, functioning as a complementarity and reinforcement (Rosales-López 2009). This verbal language of the texts should be adequate and facilitate the understanding of the contents and activities.

The pedagogical image value is recognized as a means of communication for excellence, with a recognized communicative effectiveness and, therefore, with a great impact as a means of training for students. In this sense, it is required to reflect critically on the media discourse and to analyze them from the images (Machin & Leeuwen 2007). It is not possible to be indifferent to the sociocultural discourse implicit in the iconic-verbal representations present in textbooks. The iconic-verbal language embodied in textbooks itself is an reference part for the textbook analysis and ends up serving as a justification for their predominance in relation to the textual and even sonic content included in the analyzed textbook.

Some elements associated with textbooks, such as illustrations, CDs and computer material, are highly valued by teachers when compared to the material they create (Vicente Nicolás 2010). It is thus justified that teachers should provide experiences that go far beyond the barrier of message decoding, allowing students to use several types of media as resources for expression and communication. And, in this sense, students' literacy must go beyond the domain of textual language codes, including those of a sonic and audiovisual nature.

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RESEARCH ON GEOGRAPHY TEXTBOOKS. A META-ANALYSIS OF WORK PUBLISHED IN IARTEM PROCEEDINGS

PÉTER BAGOLY-SIMÓ

Geography looks back on a rich tradition of textbook research. Over the decades, both geographers and other scholars explored content, layout, design, usage, and evaluation of Geography textbooks. Adopting a retrospective glance, this chapter explores the contributions to research on Geography textbooks in selected IARTEM monographs of the last 25 years. The results reinforce the findings of previous meta-analytical studies stating that textbook research in Geography Education and on Geography textbooks is discontinuous, methodologically redundant, analog, and content-oriented. The chapter closes by formulating first milestones for a research roadmap.

Retrospection is known to be useful particularly in the life of an academic in the age of acceleration. Looking back allows us to identify patterns, developments, paths, trends and to grasp what was considered to be relevant, fashionable, appropriate, and necessary at a certain time and under specific circumstances. More so, retrospection helps us to reflect on our own shortcomings, mistakes, identify what we overlooked or dedicated less attention to than might have been necessary. However, retrospection is not purely past-bound as it helps us to (re-)evaluate our objectives and goals, formulate new aims, design blueprints of possible ways to reach our next objectives etc. This chapter has the ambition to do all the above by looking at Geography and its role during IARTEM's first quarter of a century of existence. The retrospective exercise is important to understand both the association's history and to accompany researchers on their (newly discovered) quest for Geography textbook matters.

GEOGRAPHY TEXTBOOKS

Textbooks play a central role in the process of learning and teaching Geography. Nevertheless, meta-analytical work identified a number of concerning aspects related to geographical textbook research. Looking at selected German and international journals, Bagoly-Simó (2014) identified six core challenges.

- First, research on Geography textbooks seems to be discontinuous. Both German and international journals published papers that were triggered by major curricular reforms, paradigm shifts in Geography and/or Education Sciences, curricular reforms or technological innovation.

- Second, most studies hardly link back to already existing work. In consequence, research on textbooks in Geography Education is episodic, repetitive, and rarely innovative.

- Third, the process of operationalization seems to be one of the major challenges textbook research in Geography Education faces. While quantitative designs emerged along with qualitative ones early on, and mixed-methods enjoyed broad application, most studies exhibit a rather dull and simple methodology. Some of the studies even opted against revealing the methodology used to collect and interpret data.

- Fourth, operationalization seems to be detached from the discourse in relevant disciplines of textbook research. One of the visible consequences is a limited comparability with findings of other studies carried out on the grounds of a rigorous methodology.

- Fifth, geographical research on textbooks exhibits continuously decreasing sample sizes. This is a particular challenge for quantitative studies claiming representativity.

- Sixth, there is a strong tradition of descriptive content analysis, while textbook usage, design, selection, and evaluation plays a marginal role.

Apart from content-specific aspects, challenges of methodological nature are inherent to research on textbooks. According to Mikk (2002, 121), "[…] textbook research methods need special consideration by our association [IARTEM]. The history of science gives many examples of the importance of developing research methods. If there is no new research method, the branch of science is in the danger of decadence. New research methods usually lead to new discoveries and florishing of the field of science". This chapter links back to these recommendations and resumes the meta-analytical work on Geography textbooks (Bagoly-Simó 2014).

GEOGRAPHY TEXTBOOKS IN IARTEM MONOGRAPHS

A retrospective evaluation of work on Geography textbooks within IARTEM requires the examination of the association's academic publications. IARTEM generally follows a more inclusive publication strategy by offering various formats, such as the peer-reviewed IARTEM eJournal and the conference proceedings. Taking a closer look at the latter enables a more balanced view of work at different stages from first ideas to empirical results. In addition, specific regional particularities inherent to the location where regional (mini-)conferences took place, are also reflected in both the number and the content of the papers published by scholars from these very regions.

The *sample* selected for this chapter consisted of the digitally available volumes of both main (Selander and Tholey 2002; Horsley et al 2005; Bruillard et al. 2006; Horsley & McCall 2007; Rodríguez Rodríguez et al. 2009; Mazeikiene et al. 2011; Sikorová et al. 2015) and regional conferences (Braga Garcia et al. 2013; Naseem et al. 2016; Gómez Mendoza et al. 2016). While the 2015 Berlin confer-

ence had a thematic emphasis on subject education, the forthcoming proceedings were not considered for this chapter.

The *method* consisted of computer-assisted (MaxQDA) qualitative content analysis. In a first step, all articles were searched for the radical geograph* and its Spanish, Portuguese (geograf*, geográf*) and Galician (xeograf*, xeográf*) versions. The second step consisted of segment analysis. As a result of this process, irrelevant segments (e.g., semantic structures tied to the geographic distribution of a given sample across the country) were discarded. The final sample contained 23 papers. The third step consisted of close reading based on the category sets research question, method, sample, and general findings.

The *analysis revealed* two types of papers. A total of 15 articles belong to the first type of papers, which used Geography textbooks merely as sample, but explored research questions of secondary importance for school Geography and Geography Education. Some of these papers described potentially interesting and relevant studies to Geography. However, none of the papers presented subject-specific results with direct applicability to Geography. The remaining seven articles belonged to the second type of papers, which explored geographically relevant questions and were important for the process of learning and teaching Geography.

Regarding the *types of educational media* discussed in the 23 papers, most studies focused on traditional textbooks produced in print. Only a few studies explored truly electronic/digital media, while some contributions contrasted/compared analog and digital textbooks.

Regarding the *timeframe*, IARTEM monographs continuously published work on Geography textbooks. However, most papers merely used Geography textbooks as part of their sample. The number of contributions that explored genuine geographic research questions remained modest. Regarding their national and regional origin, studies displayed a great variety. Nevertheless, no actual national, regional or linguistic schools established a continuous record of publications within IARTEM. In essence, the volumes offered sporadic and eclectic insight into contemporary challenges of school Geography around the globe.

The overall opening of the association towards other *linguistic communities* by adding Spanish and Portuguese as accepted languages of publication led to an increased analysis of Geography textbooks. However, most studies focused on History within compound subjects, such as History and Geography or Social Science/Social Studies where Geography remained referenced only in the title of analyzed textbooks. Geographic content was not part of these studies.

Concerning the *research questions*, the vast majority of papers dedicated to Geography textbooks merely used them as part of their sample. Only seven of the

23 studies focused solely on Geography textbooks and explored aspects relevant to their content, usage, design, and evaluation.

A total of seven papers explored genuine geographic research questions. Content analysis is one of the traditional fields of textbook studies in Geography (Bagoly-Simó 2014), reason why the higher number of papers exploring different content elements is hardly surprising. In her historical study, Mok (2002) analyzed the meaning of race in Dutch Geography textbooks used between 1876-1992. While doing so, she not only explained the coordinates of change within the specific Dutch framework, but also reflected her personal methodological journey. Rodríguez Lestegás (2009) explored the issue of otherness in Spanish textbooks by taking a closer look at the geographical construction of identities. Thereby, Spain and Europe served as spatial units of analysis. The descriptive study highlighted challenges emerging from the conflict between national states, European identities, and the effects of globalization. Europe remained at the heart of another content-centered paper presented by Martinha (2009). The results of this historical work on Portuguese textbooks published between 1980-2006 showed an increasing tendency of space dedicated to Europe. In addition, the study also uncovered differences between educational media produced for Technological Courses of Planning and Environment and Scientific-Humanistic courses. While the former target group enjoyed more critical textbooks, the latter worked with less critical educational media.

The study presented by Hemmer et al. (2011) evaluated the tasks of selected Bavarian and Romanian textbooks in light of the Map Skills Model by Hemmer et al. (2010) and concluded that further work on progression and consistency of the tasks was required. Bliss (2006) also focused on the process of implementation; however, she took a closer look at how student teachers and experienced teachers evaluated innovative Australian multimedia Geography textbooks featuring transdiciplinary global education perspectives. Similarly, Knecht (2007) turned towards the student perspective and mapped the main criteria for quality evaluation of verbal representations of geographic concepts. Using the example of Human Geography, the study showed that Czech secondary school students 14-15 years of age preferred concise and understandable continuous text elements. Among the negative features identified were both excessive length and conceptual complexity as well as very concise text with limited explanation.

The work presented by Liiber and Roosaare (2005) and Lucas (2007) contained research questions connected to digital educational resources. In a descriptive paper, Liiber and Roosaare (2005) summarized the knowledge on digital resources in Estonian school Geography and introduced the only digital product available at that time. Additional statistical data originating from national surveys explained usage patterns of digital resources and infrastructure usage in the post-soviet country. In contrast, Lucas (2007) compared the layout and content of the

paper and electronic version of a Geography textbook. The data presented identified concerns of editors tied to the process of translating the paper textbook *Emergences Caraïbes* into the ebook *Atlas Caraïbe*.

The vast majority of the studies published in IARTEM monographs merely used Geography textbooks as sample. In consequence, Geography textbooks served as sample for a great variety of studies. Early work published by Mikk (2002) computed the amount of study material appropriate to acquire geographic content by assessing 854 Estonian ninth-graders. Geography textbooks also became a core part of a larger study on design and use of electronic resources in France (Bruillard 2005). Luik (2005) carried out a content analysis of gender-related aspects in Estonian textbooks of various subjects, among others Geography. Vassilchenko's (2005) quantitative study assessed the quality of textbook discourse of Geography and eight other subjects by means of correlations between students' intrinsic motivation and textbook characteristics and text quality and teacher explanations. Nogova and Huttova (2006) also considered Geography textbooks while designing and testing criteria for textbook evaluation in Slovakia, Djurovic (2007) identified by means of content analysis ideological elements in Serbian Geography texts. The work presented by Armas and Cortizo (2009) and López Facal (2009) mentioned Geography textbooks as part of their sample, however, only the former study operated with geographic concepts, such as scale for comparative purposes of Galicia, Spain, Europe, and the world. In addition, Geography textbooks exemplified the way orientalism appeared in Norwegian and other Nordic textbooks (Oxfeldt 2011). A set of studies used Geography textbooks to show outdated discourses on racism in Colombia and South Africa (Rodríguez-Gómez and Sayal (2016) and in Spain and Argentina (Pozzo 2013). Some authors considered Geography textbooks when exploring textbook adequacy in light of the national standards (e.g., Kapfidze 2015 for Zimbabwe) and textbook selection done by teachers (i.e. Cortino Liotti and Torales Campos 2016 for the case of Brazil).

Studies dealing with Geography textbooks showed a great variety of research methods. While the repertoire of the 15 studies featuring Geography textbooks in their sample was quite broad, publications exploring genuine geographic questions showed a more modest picture. With the exception of a few studies offering rather scarce information on methods and sample (e.g., Lucas 2007), all contributions described the steps of data collection and analysis. While Liiber and Roosaare (2005) merely referenced empirical data published elsewhere, Rodríguez Lestegás (2009) worked with a clear sample without offering insight into the methodological steps leading to the conclusions formulated. Bliss (2006) applied questionnaires with open-ended questions on non-representative samples, Knecht (2007) carried out tests with 52 students to evaluate 25 concepts derived from twelve texts. Both Martinha (2009) and Hemmer et al. (2011) worked with content analy-

sis based on pre-defined categories. Lastly, Mok (2002) related about a rhetorical analysis connected to content based on case studies. This contribution is unique due to the intensive reflection of the process of operationalization in different contexts, based on varying needs, and at different stages of the researcher's career. It contributes greatly to raising awareness to the necessity of both methodological rigor and progress.

CONCLUDING THOUGHTS

Research on Geography textbooks in light of work presented within IARTEM conferences reinforces the previous meta-analytical findings (Bagoly-Simó 2014). While additional monographs, series, and selected journals are still awaiting exploration, some of the milestones of a roadmap for research on Geography textbooks are already becoming evident. First, methodological innovation needs to be explored (cf. Mikk 2002). Second, creative training formats for (emerging) scholars interested in Geography textbooks should support an enriched operationalization process. Third, comparative and contrastive perspectives seem to be helpful to broaden research on Geography textbooks by taking it beyond the borders of the content. Fifth, a more dynamic view of textbooks might shed light on specific processes of classroom ecologies (e.g., by means of usage, development etc.). Sixth, considering additional (digital) educational media might link research projects to classroom realities and students' learning habits. Seventh, exploring the geographical aspects within compound subjects, such as History and Geography in France or Social Studies in Spain, seems to be a necessary endeavor to comprehend subject-specificity. Looking back at IARTEM's first quarter of a century, there is no better home to start shaping the future of textbook research in Geography Education and on Geography textbooks.

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TEACHING MATERIALS AND ADULT EDUCATION

MARÍA-HELENA ZAPICO-BARBEITO

Education for adults and the elaboration of materials for adults constitute key pillars for an authentic education society. For this reason, the design of far-reaching and versatile adult training programs should be encouraged by all parties ranging from public administrations to the private sector, to NGOs, associations and social actors of the most diverse nature. Likewise, materials should be devised to facilitate mobility and provide citizens with the necessary instructional tools to participate actively and critically in the knowledge society within the scope of continuing education. The didactic resources elaborated within the sphere of adult and elderly education should shed any stigmatizing view of aging to truly reflect the right of people to be educated throughout their lives so that programs and educational materials may be diversified to connect with the needs of these age groups. In the course of this chapter, we will delve into these issues, as well as the possible types of resources, functions, requirements and criteria for the selection of didactic materials for adults.

DIDACTIC MATERIALS AND EDUCATION OF ADULTS

What are some of the defining characteristics of didactic media elaborated with and for adults? Is it possible to make an effective classification of these educational resources? What are some of the recommendations and essential guidelines offered by both international organizations and experts in the field of design, evaluation and implementation of materials for adults? In these few lines, we aim to delve into these and other questions.

ADULT EDUCATION AND EDUCATIONAL MATERIALS: TOWARDS AN ACTIVE AND CRITICAL CITIZENRY

Nowadays, the expression "adult education" refers to the range of learning processes by which people considered adults by their social milieu develop capacities, enrich their knowledge, improve their technical and professional skills, or are reoriented to meet their own needs and those of society. Thus, attitudes and behaviour evolve both in terms of integral enrichment and participation in a socio-economic and cultural development which is balanced and independent (López-Barajas & Sarrate 2002; UNESCO Institute for Lifelong Learning 2017). In that sense, adult and elderly education should contribute decisively to the economic, social, cultural, scientific and technological development of the whole community.

More than merely a right, lifelong education is currently considered one of the keystones of the 21st century (Bedmar & Moreno 2009). It is both a consequence of active citizenship and a condition for full participation in society. It is an extremely useful concept for promoting ecologically sustainable development, democracy, justice and gender equality, as well as scientific, economic and social development. And it is useful for building a world in which violent conflicts are replaced by dialogue and a culture of peace based on justice (Aznar, Fernández & Hinojo 2005). Adult education helps shape identity and gives meaning to existence. Lifelong learning means rethinking the contents of education to reflect factors such as age, gender equality, functional diversity, language, culture, economic disparities, etc. (Álvarez Castillo 2004; UNESCO 1997).

The principle of continuing education, or lifelong education, together with the range of cultural opportunities available to citizens and the no less relevant need to participate in the job market have given rise to a pedagogical modality, confirming that education is not just for children and youths but also for adults (Tedesco 1995; Sánchez Martínez & Sáez Carreras 2007). In this sense, adult education and the development of materials for adults require the participation, support and encouragement of all sectors in contexts where adults develop. Similarly, the path towards the knowledge society, supported by information, the use of new technologies and the use of the media, opens up new expectations for the adult continuing education (García Carrasco 1997).

With these considerations in mind, here are some of the priority actions carried out in the context of adult education (Jabonero, López & Nieves 1999; UIL 2017), a kaleidoscopic universe that corresponds to the main fields of the design, creation and implementation of materials for adults and the elderly: literacy; basic education; job training; secondary and higher education; training in the knowledge of other languages; training for leisure and free time; training in the use of new technologies at work and to obtain information; training for participation; training for integration and equal opportunities; and training for the conservation of health and the environment.

For its part, the Hamburg Declaration on Adult Education (UNESCO 1997) already highlighted the need for promoting new approaches to adult and elderly education within the framework of lifelong learning, with the ultimate goal of creating an authentic education society. Nowadays, the international foundations for the promotion of adult education continue to developed, with an eye on the Sixth International Conference on Adult Education (CONFINTEA VI) to be held in 2017. The range of approaches and frameworks (UNESCO 2009) run parallel to the main settings for creating materials for adults and to the new classification of teaching resources for adults and the elderly, involving the following topic areas: women's integration and autonomy; peace and education culture for citizenship and democracy; diversity and equality; health; environmental sustainability; edu-

cation and indigenous culture; adult literacy; economic transformation; and access to information and learning under equal conditions for the elderly. All these actions, integrated in a broad and global adult education plan, should cover the training needs of this heterogeneous population sector throughout life, in accordance with the immeasurable diversity that characterizes this group.

We cannot ignore, however, that adults and the elderly are often considered from an incorrectly uniform perspective, thus explaining all those materials and programs designed for them with a standard nature (Bermejo 2010; Limón Mendizabal 1996). This group of people, especially the elderly, is often referred to as if they were all the same, thought in the same way and came from the same cultural and social background, and sharing the same economic status. However, nothing could be further from the truth. In this sense, we agree with Sánchez Martínez & Sáez Carreras (2007) to ensure that the age criterion is not valid in this case. It is not sufficient to refer to education and materials for adults and the elderly based solely on age. Other assumptions (e.g. historical contingencies referring to cultural, social, economic, personal circumstances...) must be used to build discourses and design educational practices and resources for adults and the elderly.

Therefore, we should definitively banish the perception of adult education – especially for the elderly - as a "new schooling" under a formal regulated system. Instead, we should advocate a conceptualization involving personal development and growth, improved interpersonal relationships, optimized physical and mental state, increased self-esteem, as well as achievement and social involvement that helps adults and the elderly feel useful and competent to participate and take decisions personally in the development of their community (Martínez de Miguel 2003; López-Barajas & Montoya Sáenz 2003).

TEACHING RESOURCES FOR ADULTS: REQUIREMENTS, FUNCTIONS AND SELECTION CRITERIA

The materials, proposals and initiatives specifically designed to meet the educational demands of adults and the elderly in the context of the demanding modern information and knowledge society should bring together a series of fundamental characteristics (as noted by Jabonero & Nieves 1999):

— *Flexibility*: Educational materials must be sufficiently flexible, open-ended and multi-faceted to contribute to change, reflection and a critical attitude by the participating adults, and thus addressing their personal needs. Didactic resources for adults must be customizable, include contents with transferential functionality and go beyond the adult education program in question (Sarramona 1992).

— *Dynamic*: Capacity to evolve, easy introduction of changes and modifications. For this, the proposals and didactic materials targeting this age group must promote a bidirectional teaching-student relationship in a process that fosters the exchange of roles through a confluence of knowledge; i.e. the adult or elderly person is a potential source of valuable experience who can offer new perspectives and diverse visions that complement the knowledge provided by the teacher. This makes for a more compelling, valuable and stimulating learning experience with benefit for the self-esteem of the participants, as well as improved interpersonal relationships that go beyond traditional teacher-student hierarchical roles (Bedmar & Moreno 2009; Martínez de Miguel 2003).

— *Versatility*: Potential for application to diverse fields and situations, neither exclusive nor restricted. Materials should allow for varying pedagogical uses in diverse educational situations.

— *Diversity*: Design, evaluation and adaptation of all kinds of materials aimed at all adults without discrimination based on age, sex, personal situation, social origin, or culture. It is necessary to keep ideological underpinnings in mind during the process of elaborating didactic resources, so that these resources foster permanent reflection on the relation between individual identity and the globalized world.

— *Uniqueness*: Materials based on specific methods and techniques, appropriated and adapted to both to the target audience and the educational activities themselves. The contents must respond to the needs, context, identity and reality of the adult participants, thus contributing to integral development at an individual, community and social level (Bermejo 2010; Petrus 1997).

In this way, resources, media and didactic materials become instruments that facilitate and enable the teaching-learning process within the framework of adult education. Their value derives both from their didactic potentiality and the ability to motivate and articulate the student's relationship with all the other elements of the educational process. Their importance resides, essentially, in the ability to mediate between reality and the learner; the ability to present and transform reality; to focus attention or reorient debate, thus being able to represent individual and collective experience and stimulate adult learning. These resources are also capable of performing a compelling, recreational and emotional function that intensifies the intrinsic motivation of adults towards the teaching-learning process, promotes creativity, free thinking and the ability to interpret, as well as enabling the development of student sensitivity and expressiveness to bring out their experiences and feelings (Bermejo 2004). Resources and pedagogical media can make learning enjoyable, help define the roles played by the teacher and the adult learner,

and determine the consideration merited by the information and the educational content as well as the value of the dialogue and relationships with others. In addition to influencing cognitive and attitudinal student processes, didactic materials are capable of transforming roles and relationships in socio-educational processes (Uría 1998). For all these reasons, didactic media cannot merely be considered auxiliary or circumstantial instruments. Instead, they hold great pedagogical value and ideological significance within the teaching-learning process in the field of adult education; hence the importance that they be selected based on highly rigorous technical-pedagogical principles (Santos Guerra 1991).

We will now point out some of the fundamental criteria to be taken into account when selecting the most appropriate didactic materials for each situation of adult education (Bermejo 2004). These materials need to have the following characteristics: coherent with the objectives and educational contents proposed; compatible and suitable for adults and the elderly (as individuals –in accordance to such aspects as their abilities, prior experiences, knowledge, desires, fears, prejudices, etc.– and as a group –in accordance with aspect such as maturity, intimacy, group size or setting); include variety and progressive difficulty with respect to the experience and reality which they refer to or represent (from the concrete to the abstract) as well as their degree of elaboration (openness and elaboration by participants). It should be noted that materials and didactic resources for adults and the elderly can also be classified according to their purpose: to motivate, stimulate and focus on an idea, activity or program; provide instruction in aspects of the teaching process (e.g. manuals, reference books and methodology guides); support, complement, expand, and/or reinforce previous learning by the group. All of these fulfil essential functions when it comes to enhancing the communication capacity of adults and the transmission of the educational message; awakening and increasing the interest of the participants towards teaching-learning objectives; and increasing the learners' capacity to generate correct answers, as well as their retention of knowledge and skills that allow transference to real situations (Undurraga 2004).

DESIGNING MATERIALS FOR THE ELDERLY

Insofar as the process of design, evaluation or implementation of didactic materials for adults in community settings, the group's differentiating characteristics and unique profile need to be taken into account. In addition, educational resources for adult and elderly teaching-learning processes should meet a set of criteria (Peces 2000): functionality (useful learning for life); individualization (meticulous adaptation to the rhythm and abilities of the adult learner); contextualization (based on local setting and making use of it); significant learning (based on prior experiences); globalization (joint approach of aspects in the curricular development); and interdisciplinarity (so that contents can be complemented in

different areas; interdisciplinary teams are required in the materials elaboration process with effective communication mechanisms to make the resource integral, flexible and current). The process of elaborating materials with and for adults can be broken down into the following phases: approach to the subject (so that students can reflect their experiences); research and analysis (to achieve subsequent objectification); taking of positions (trying to provoke a change of attitudes) and evaluation (Bringas 2000).

In any case, the conception and implementation of this sort of didactic materials for adults attempts to encourage the development of reflective learning skills, identified through the implementation of Schön's theories (1998) regarding reflective professionals. Adults and the elderly can follow a process that goes from personal experience to practice to new experimentation, and from there to the evaluation of the experience, assimilation and change (Escarbajal de Haro 2004). In this model, the relationship between theory and practice –the designed materials as well as the whole didactic process with adults and the elderly– is neither linear, nor is there subordination between the second and the first, but rather theory is configured through practice in a dialectical relationship so that practice can improve theoretically (through intersubjective reflection and communication skills) and also practically (based on practice itself, by understanding the new situations that arise). Thus, in the field of education and resources for adults and the elderly, training processes become reciprocal between teachers and learners. Rather than pursuing objective knowledge or technical learning, they aim for reflective and practical knowledge (Sáez Carreras 1997; Quintana 1993). The production of didactic resources for adults is a process closely linked to teacher training and innovation initiatives that optimize teacher professional development.

At this point it is worth pointing out some of the commitments made and the recommendations expressed at the V International Conference on Adult Education regarding didactic materials produced for this learner category. For example, enrichment of resources and literacy environments in three priority directions was strongly urged: fostering the use and consolidation of the knowledge acquired in the process of adult education, through the production and dissemination of printed and digital material of interest at the local level, promotion of production and/or reworking by students themselves; active collaboration with producers and publishers to adapt existing materials so that they are accessible and understandable to new readers (whether they be press, legal, academic and scientific documents, or fiction); and creating networks for the exchange and distribution of locally produced texts that reflect community knowledge and practices. Moreover, the idea is to stimulate and encourage better synergy between the media, new information technologies and adult education, thus, reinforcing the educational function of the media and helping users to respond critically to it, guaranteeing equitable access to open and distance learning systems and new information and communication

technologies, using them to explore non-conventional forms of learning; examining the development and dissemination of new technologies from a regional, local and cultural standpoint, given the uneven development of infrastructure and equipment availability; stimulating the development, evaluation and application of adequate resources for adult education; and promoting its dissemination at the regional and global levels.

Ultimately, we should aim to optimize the quality of teaching programs and materials used in adult education, from a community perspective, establishing links with the traditional knowledge and culture of minorities. Doing so would require the improvement of the didactic process and the quality of own elaborated or adapted resources, through the following: student-centred strategies; attention to language and culture diversity; student participation in the elaboration of materials; intergenerational learning processes; use of local languages, knowledge and appropriate technologies; establishment of closer ties between the literacy framework and areas such as health, justice or urban and rural development; basic and applied research; the use of appropriate technologies to support teachers and students; the collection and dissemination of examples of effective practices; or the effective communication of research results in the field of didactic materials design and evaluation.

A FINAL WORD: LOOKING TOWARD THE FUTURE

Finally, it should be noted that the ultimate goal of providing adequate answers to the training needs of adult students requires exhausting all possible learning paths and experiential opportunities that may motivate as well as enrich the process of continuing education. One very feasible path involves materials focused on the application of new technologies, i.e. teaching materials in electronic format for adult education, because digital technology provides powerful tools for learning and personal expression as well as for building, maintaining and sharing identity. ICT can become platforms for transforming learning processes themselves, making them more attractive and motivating for adult students so as to become tools for improving personal conditions and interactions with others (Bermejo 2010). Likewise, the process of elaborating didactic materials in digital format can come to be an appropriate strategy for stimulating and training teachers in the pedagogical use of new technologies (Area 2014). In a society where intergenerational uncertainty may be greater than ever, digital literacy for adults –for the elderly in particular– may also be an opportunity for building bridges that enable intergenerational understanding.

In short, as we have seen in these short pages, the field of teaching materials and resources for adult education is overwhelmingly extensive, complex, and heterogeneous in terms of present and future potential.

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MANUALS FOR TEACHER EDUCATION IN BRAZIL: RESEARCH PERSPECTIVES

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INTRODUCTION

> *If we already have school reading books, some of them appreciable, we have very little compared to compendiums for the normal course.* It is difficult for students to refer to works written in foreign languages, which they do not understand well, while delaying in the vernacular with the poor translations that are done. *For this reason, any work that enriches the didactic literature with publications of value over the subjects of the normal course should be considered meritorious. [...]* Students need to have a safe guide for all times, which will be a useful helper of the teacher.
>
> *(Firmino Costa, emphasis added).*

To start this text, the words of Firmino Costa were chosen. They emphasized some qualities of the object that is in focus in this text: the manuals destined to the formation of teachers in Brazil. As the author himself pointed out, books of this type came to "enrich the actic literature" in dealing with "normal course subjects[1]" and offer teachers, especially those at the beginning of their career, "a safe guide of all hours", "useful help".

Firmino Costa highlights his concerns about the education of future teachers, since, at the time, he worked as Technical Director of the Course of Application of the Normal School Model. Thus, through a review in the Educação Magazine, he collaborated with the publication of João Toledo's book, entitled **Didática**, which had recently been published.

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[1] In Brazil, the Normal Course was created in the 1830s, but it was only consolidated a century later, when it began to form a more significant number of primary teachers in different cities and states of Brazil. In its beginnings, this School basically taught primary school subjects, but it has undergone changes in its curricula over time, incorporating more and more disciplines called vocationalisers, as was the case with Didactics, Pedagogy, General Methodology and Special and Teaching Practices. A brief notice should also be given of the existence of different Normal Schools, such as the Primary Normal School and the Secondary Normal School. In 1971, according to Law no. 5692, this course was replaced by another one, at middle level, called Specific habilitation for the Magisterium, which started to train teachers in the first four grades of the then First Degree (this replaced the so-called Primary School). These are some aspects of the history of the Normal Course in Brazil, very well marked by Tanuri (2000).

Romão de Campos (**Correio de São Carlos** newspaper collaborator) made similar comments to Toledo's **Didática**, presenting it as "a splendid book", "a real regal gift to the teacher". In his review, Campos concluded that the book was "a precious gift to the teachers of our land: it guides, instructs, stimulates, enthuses" (1930, 382, emphasis added).

Didática is an example of the production that interests the research referred to here. Written by João Toledo, then General Inspector of Teaching in São Paulo, **Didática** was published twice in 1930 by Livraria Liberdade. As stated in its pages, it described how to teach the subjects of the primary school, corresponding to a "doctrinal exposition", based on the conditions of the schools and accompanied by illustrations and plans that clarify the recommended processes.

Many other examples of this type of production could be mentioned here. Written manuals to guide teachers in their teaching practices have been published in Brazil since the 1870s. Until 1970, after a century of existence, it is possible to count approximately 60 titles, not including reissues. This type of material continues to be edited but has not yet been privileged in educational research. Although little studied, there is no doubt that these books contribute to understanding the constitutive elements of the teaching profession and also allow us to know ways of teaching and learning in a given society and time.

It is known that school textbooks are an element of school culture and, as such, are considered as relevant sources for the study of different aspects of schooling, as well as the relationships that societies establish with books and reading, in a wider range. The concept of school culture is especially useful in the study of textbooks because, as Chervel (1991) emphasizes, it allows attention to the specificities of the functioning of the institution and the work of teachers.

In addition, when considering the concept of Dominique Julia (1995), it is possible to emphasize, firstly, the norms from which the contents and behaviors to be taught to the students are conceived. These norms are explained in the teachers' manuals, since, according to Julia (1995), they cannot be analyzed without taking into account the professional category of the agents who must follow these orders. Second, the concept of school culture is related to the practices that allow the transmission of this knowledge. This means considering that pedagogical manuals, when addressed to teachers, elaborate and disseminate the knowledge from which the school culture is constructed.

However, other questions arising from the use of this concept can be considered. Diana Vidal (2005) retakes the concept as it is thought by Augustín Escolano (1999), when distinguishing three cultures of the school. One is called empirical, practical or material, being produced daily by teachers; the other is the policy or regulation, that is, it corresponds to the rules that govern the functioning of

schools; and finally, there is a culture of the scientific or pedagogical type, elaborated, according to the author, to explain or propose ways of typical school work. The knowledge of the manuals refer precisely to this last modality, occupying a specific place in the dynamics of construction of school culture.

The concept of school culture also makes it possible to place teacher education manuals in a broader set - that of school textbooks - in which titles for the most diverse series and subjects of the education system are collected. In the Brazilian case, these books also have an influence on reading beyond school walls, as the results of the research entitled "Portraits of Reading in Brazil[2]" reveal. Its objective was to measure the intensity, form, motivation and reading conditions of the Brazilian population. The survey indicated that 66% of respondents have the textbook as their first reading genre, followed by the Bible, which justifies the researchers' concern to study didactic production in the country.

Since 1985, Brazilians have access to textbooks mainly through the National Textbook Program (PNLD)[3]. This program was created by the federal government, with the explicit intention of subsidizing teachers' pedagogical work. Currently, all elementary school students receive their copies for use during the school year, in the different curricular subjects; but the books are also understood as support to the work of the teacher and therefore are accompanied by methodological guidelines and suggestions complementary to their use, configuring a complementary material denominated in general, Teacher's Book, or Manual of orientations to teachers.

Alongside the PNLD, the Ministry of Education has maintained, since 1997, other programs related to school books, such as the National School Library Program (PNBE), "whose purpose is to promote access to culture and encourage reading for students and teachers through distribution of collections of literature, research and reference works "(Brazil 2008). Within PNBE there is a specific action called Teacher's PNBE that aims to "acquire reference works to help teachers of regular basic education and the education of youth and adults in the preparation of teaching plans and in the expansion of classroom activities with the students. " (Brazil 2008).

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[2]   INSTITUTO, P. Retratos da Leitura no Brasil. , 2016. Available at: http://prolivro.org.br/home/images/2016/Pesquisa_Retratos_da_Leitura_no_Brasil_-_2015.pdf Accessed on: 13/07/2018. This research was performed through home interviews in person, throughout the national territory. The public really was Brazilian peoples literate or not.

[3]   This program distributes textbooks and collections of literary works, complementary works and dictionaries to primary and secondary schools. The PNLD runs in alternate three-year cycles. Each year the National Education Development Fund distributes books for all students, replaces and complements books that can be reused for other stages. (Information available at http://www.fnde.gov.br/programas/livro-didatico, accessed on 06/07/2017).

Among these books for teachers, there is a type of book that was constituted in the interest of the researches that will be focused here, systematizing results obtained from disciplines and areas of knowledge - General Didactics and Didactics of Natural Sciences and History . They are manuals designed to guide teaching and receive diverse denominations such as didactics manuals, teaching methodology manuals, teaching practice manuals, among others. It can be said that these manuals are closely related to teacher education, as they aim to contribute to the teaching work in the organization and development of teaching, including in specific school subjects.

Somehow, they present structural and pedagogical characteristics that seem to have been taken as reference by the Ministry of Education when defining the elements that must compose, necessarily, the books for teachers of the PNLD, that accompany the books for the students. In this sense, the research on teachers' manuals, which already has a tradition in the Brazilian educational field (as it will be pointed out later), has gained new motivations for its relevance, be it in the existence of the Library Program for Teachers or in the PNLD.

In this text, questions that justify the interest for this research topic will be explored in the Brazilian case, highlighting contributions made by different researchers. In the first section, the theoretical framework that supports a set of investigations carried out and underway in the scope of the Research Center on Didactic Publications of the Federal University of Paraná (Brazil) will be presented. Next, results of research will be presented in specific subjects and the possibilities of further studies in the theme will be pointed out, still lacunar in Brazil and in other countries.

MANUALS FOR TEACHERS: A DIVERSE SET TO BE STUDIED

Since the late nineteenth century, but with greater force in the early decades of the twentieth century, manuals for teachers circulated in Brazil. Closely linked to the need and intentions of the State to train teachers, they circulated pedagogical ideas and teaching models, constituting a complex and diverse set of works whose content is knowledge about education and teaching. Nagle (2001) used the term "pedagogical literature" to define such books that fulfill the main function of addressing the teachers in formation, at that time especially the normalists.

This literature has changed throughout the twentieth century, in relation to other transformations that occurred in the educational system and teacher education. Different denominations are used by researchers to identify such works. Silva (2018) uses the expression "pedagogical manuals" for books that were produced for teacher education, especially the Normal Schools that prepare professionals for primary education during the nineteenth and most of the twentieth century. These manuals "had teaching as their object of teaching" (2018, 68), and according to

the author include both works of Pedagogy and works of Teaching and Teaching Methodology.

For Silva (2018), this type of manual was used in different parts of the world during the constitution of public and compulsory education systems by the State, constituting compulsory reading texts both in education and in entrance exams for the teaching career. The author stresses the importance of the study of these manuals recalling that they "produced elements of a school culture" (Chervel 1990; Julia 2001), as well as "places of a pedagogical culture" (Escolano 2006).

In this sense, it is also relevant to say that these manuals circulated, and in this way, they put into circulation the knowledge that was produced in different places. Silva (2018, 25) highlighted the nature of this process by means of a metaphor - "traveling knowledge in pedagogical manuals" - from the place of production, the ideas traveled through "multiple and diverse paths" in the interpretations made by its readers, in other places and times.

Some examples may clarify this perspective. The work Teachings of things, by Norman Allison Calkins (1886) and translated by Rui Barbosa[4], circulated in Brazil putting in circulation in different parts of the country fundamentals and ways of teaching the intuitive method. Another work to be mentioned is one written by Cuban educator Alfredo Miguel Aguayo, which circulated in the country from the 1930s to the 1960s with the title of Didactics of the New School, a translation included in the collection **Atualidades Pedagógicas,** edited by Companhia Editora Nacional.

Referred as "little legitimized in the educational and historiographic field," Silva (2018, 44) points out that "these books were marked, paradoxically, by an extensive use, because they were compulsory readings in teacher education courses." For the author, who identified fifty-five manuals circulating between 1870 and 1970, these books assumed the role of "mediators between the prescriptions of the State and science and the practices developed along with the students" (Silva 2018, 44)

Oscillating between content of a more theoretical nature or more oriented to practices, the manuals presented to the teachers in formation the thinkers who stood out in the educational scene in other countries, like Dewey, Pestalozzi and others. Projects developed elsewhere were also analyzed and commented in the manuals by authors who were intellectuals, successful and valued educators, teachers of normal schools. In addition, the methodological guidelines have occupied the pages of these books for teachers.

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4   The pedagogical manuals, for the author, constructed discourses "with scientific forums about the nature of the school act, the space-time of the school, the childhood, its Psychology and its development, the physiological questions, among other references that legitimized the way in which pedagogical knowledge was selected and read." (Silva 2018, 47)

Among the pedagogical manuals of Teaching and Teaching Methodology there are some that have as object of teaching the teaching of specific school subjects. According to Bufrem, Schmidt & Garcia (2006), they are not works that propose to present the content of a discipline - as it happens with the textbook for the students - but they propose to guide the teaching of that particular subject. For the authors, these are the specific Didactics manuals.

The analysis of these manuals allows us to understand the movement by which certain modes of teaching have been consolidated throughout the century, and also allows tracing the trajectory of the contents to be taught. Thus, they are considered "visible elements of the disciplinary code" (Cuesta 1998) that contribute to understanding the constitution of the school subjects - in this case those related to the field of Specific Didactics.

With these initial notes, this chapter presents results of research carried out on General and Specific Didactics manuals, in order to highlight the relevance of these studies and the need to broaden this thematic field among research groups that study school textbooks. It is a topic that concerns the History of Education, but also the research of an epistemological and didactic nature that, according to Choppin (2004), would require a greater investment of the researchers.

GENERAL DIDACTICS MANUALS: FROM THE TEACHING METHOD TO CONTEMPORARY THEMES

From the point of view of the General Didactics manuals research, investigations were made by Garcia (2006; 2007; 2010) with the intention of understanding the constitution of the school discipline called General Didactic and the production of these manuals, placing them at particular moments in the history of Brazilian Education. While those researches focused on books published until the 1970s, others followed a survey of didactic manuals produced after the decade of 1980. (Garcia & Hegeto 2011, Hegeto & Garcia 2017, Hegeto 2014)

In the first two decades of the twentieth century, period which Nagle (2001) refers to as "an inheritance of the Empire" - in which, according to him, educational discussions are not very intense[5] – some publications may be characterized as specifically pedagogical and whose titles expressly refer to the field of Pedagogy, alongside works that make a" fairly generic presentation of the problems of education related to the republican regime "(340).

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5   It is recorded here that this way of describing and analyzing the first years after the advent of the Republic in Brazil is problematized by researchers who, in examining, for example, the educational press, point out the need to shed light on other movements that contribute to delimit and organize the educational field in this period that precedes the major reforms from the third decade (see, for example, Catani 2003).

However, among the works of the early years of the twentieth century, the collection of the NPPD (UFPR / BR) includes the "Treaty of Methodology", coordinated by Felisberto de Carvalho, whose third edition dates from 1909. The work highlights, right on its cover, the fact that the review was done "by a teacher" with 17 years of teaching, whose experiences help to compose the content of the book, along with ideas taken from French authors' works.

In this work, which is divided into two parts - General Methodology and Special Methodology - Didactics is defined as "the part of the methodology that seeks, formulates and demonstrates the main rules to follow in teaching" (Carvalho 1909, 10). There is, therefore, evidence of concern with the method that was already present in the first decade of the twentieth century among teachers[6].

In the 1920s, in the context of the numerous reforms of primary and normal school proposed in the country, the educational literature suffered, according to Nagle (2001), a significant transformation. For the author, the educational literature in this period expresses, as well as the reforms and remodeling in public education, the confluence of two movements - social unrest and pedagogical optimism. And this literature - represented by the pedagogical manuals - "plays the role of preparer and transmitter of the new modalities of perception of the educational problem especially from the point of view of the movement of the New School". (2001, 336)

For the purposes of this text, it is valuable to recall that the ideals of the New School produced a quantitative and qualitative influence in the educational literature. (Nagle 2001, 310). Changes in the conception of childhood and in the sense of what is to learn, in the understanding of the role of the teacher, the nature of the curriculum and its school subjects, in the forms and teaching strategies, constitute a transformation in the very content of schooling.

The concern with the new models for teaching and learning situations is expressed, therefore, in the manuals for teachers produced and distributed during this period, which are sources for the understanding of the constructions that were being carried out regarding the method of teaching, because in them the "concern is to systematize the set of technical-pedagogical norms that should be employed in the conduct of classes and in the teaching of subjects." (Nagle 2001, 345).

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6 The idea of a Modern Pedagogy that was defended by the publisher Dario Velozo was found in a work on the "A Escola" Magazine, published between 1906-1910 by the Public Teachers' Guild of the State of Paraná. In issue no. 7 (Aug. 1906) two articles with the general title of "Pedagogy Course" appear, where the questions of "Methods" and "Reading and Writing" are dealt with, and from then on it becomes constant in the publication the presence of subjects specially focused on the teacher's work methods. (Garcia 2003)

Even with the permanence of the traditional teaching model, the need for a new didactic gains power in the school culture - or as the titles of the manuals begin to announce, "Didactics of the New School", expression that serves as title to the work of Aguayo (originally published in 1935), in which other titles emphasize the centrality of method concerns. It is important to note that the Francisco Campos Reform of 1931, unlike previous reforms, presents methodological instructions through Decree 19.890.

In the following decades, and throughout the twentieth century, didactics manuals are published, and the first located so far that presents this title was the work written by João Toledo: Didactics in primary schools (1930, available in the NPPD/UFPR collection). Mentioned at the beginning of the present text, this book is intended to guide the teachers of the Normal Schools who since the 1920s have included pedagogical disciplines identified by different names in the curriculum: "Methods and Processes of Teaching, Methodical Pedagogy, Methodical and Pedagogical Theory and Practice, Pedagogy and methodology, Pedagogy and Direction of Schools". (Veiga 1989, 45).

The names then attributed to the pedagogical discipline emphasize the relationship of its contents with the need to discuss teaching methods. If this seems clear today, the understanding of the relationship between such disciplines and Didactics was not always so obvious. In a study done on the manual entitled "Didactics of the New School", by Aguayo, the author claims that the denomination Didactics was confusing. According to him, Didactics should be understood as the "direction of learning", an understanding that remained present in the following decades in different pedagogical manuals (Aguayo 1941, 3).

In the Brazilian educational scenario, Aguayo played a prominent role because his works meant a large part of the readings for teachers. In the pages of the more than forty manuals of Didactics, Pedagogy, Methodology and Teaching Practice written and published in Brazil between 1930 and 1971, this author was one of the most mentioned. His book, which is also a pedagogical manual, was quoted recurrently, as it was the case with other great authors, such as John Dewey, Ovid Decroly, Edouard Claparède, Georg Kerschensteiner, Joahnn Friedrich Herbart, Joahnn Heinrich Pestalozzi and Maria Montessori, just to mention a few examples (Silva, 2001).

Aguayo was born in Cuba, where he dedicated to teaching in teacher education courses and reorganizing popular schools, in order to give them a new direction. In the Dictionary of Pedagogy directed by Luis Sarto (1972), this author is presented as an illustrious contemporary figure of the educational field, being attributed to him the foundation of a laboratory for children studies, in the University of Havana, where he had graduated as a pedagogue. Many of his books have been translated into Portuguese and have been read by a large number of the teachers being trained.

Also in regard to secondary teacher education courses, that is, in obtaining a degree, Didactics has already been present as a subject or course since 1939. Since 1941, it was offered after three years of baccalaureate in a year of formation specific to education (Oliveira1993, 60). As a course, its scope included General and Specific Didactics, Educational Psychology, School Administration, as well as biological and sociological foundations of education.

Maintained as a subject in the Philosophy, Sciences and Literature Faculties, Didactics no longer includes specific didactics in the 1960s, when teaching practices in supervised stages began to comprise the subjects of teacher education.

In the early 1960s the titles of the manuals for teachers refer to General Didactics. The initial amplitude is therefore restricted and the manuals for the teacher - to teach them to teach - produced in the 1950s and 1960s, express these changes in the way of understanding the disciplinary field of Didactics. The themes related to Renewed Didactics, with active methods, and the direction of learning remain present even in the 1970s.

But on the other hand, programmed instruction and directed work begin to be valued in an instrumental perspective of Didactics, gradually replacing the old great concerns about teaching, its purposes, its general and specific methods, the requirement of planning and controlling activities in teaching and especially in learning. This is related to the political context in Brazil after the coup that established the Military Dictatorship in the country (1964-1984), when Didactics relied on the presuppositions of a technicist pedagogy, seeking to "develop a non-psychological alternative, situating itself in the educational technology, having as basic concern the effectiveness and efficiency of the teaching process" (Veiga 1996, p.35).

This perspective guided the preparation of manuals for teachers as *General Didactics through instructional modules*, by Ângela Reis and Vera Joullié - published in 1981. The proposal of the work – opting for "the methodology of Instructional Modules" - is the training of teachers of the middle course level (an old normal course that started to be called a Teaching Degree from 1971) as well as in higher education.

The work is structured in seven parts and one of them adds the twelve instructional modules that organize the contents of the course of Didactics: 1. Contributions of Psychopedagogy for today's Education; 2. Education today; 3. Learning; 4. Curriculum; 5. Teaching Cycle; 6. Didactic planning; 7. Educational objectives; 8. Evaluation; 9. Construction of tests and items; 10. Strategies for horizontal integration; 11. Group techniques; 12. Audiovisual resources. In a separate volume, there is an initial test (pre-test) and a final test to assess student learning, appropriate to the perspective of self-instruction and learning as behavior change.

As a consequence of this conception, Didactics is conceptualized by the authors from Nérici (1973, 5) for whom it is "the study of the set of procedures that aims to guide the student's learning more efficiently in the acquisition of knowledge, automatism, attitudes and ideas."

These transformations in the conception of education, derived from the "Brazilian socio-political model based on the national development-security and the education model as a factor of social development" (Oliveira 1993, p.30), pointed out the existence of a deep crisis in the subject in the 1980s, pointed by authors such as Oliveira (1993) and Veiga (1996).

This crisis provoked the need for a reconstruction of Didactics in order to overcome the instrumental focus that had become its most prominent feature. These processes are expressed in General Didactics manuals during the 1980s and 1990s, a period that was focused on Hegeto's research (2014), extending the analysis of manuals produced until 2013. The researcher located eighteen manuals and selected nine of them for analysis, three from each decade.

The orienting categories of the analysis were related to the conceptualization of Didactics, the themes and the teaching activities proposed by the authors. Among other results, the research evidenced that teaching remains an object of the subject in this period, but the instrumental conception has lost power in the last decade. However, the themes that Hegeto called classics of the subject - such as planning, objectives, methodology, teacher-student relationship and evaluation - predominate.

Among the new themes, the researcher included technologies, computer science; multiculturalism, inclusive education, sexuality issues of gender and ethnicity among others that are the result of new social demands and processes of social achievements by rights. The manuals, in this perspective, are understood as visible elements of the disciplinary code and so, from them, the research allowed to locate transformations that occurred in Didactics, as a subject for teacher education.

SPECIFIC DIDACTICS MANUALS: DIVERSITY AND RESEARCH POSSIBILITIES

Similarly to the General Didactics manuals, the Specific Didactics manuals were also little valued by the research until the last decade. Bibliographical review on the subject indicated that among the first studies directed to these manuals of Specific Didactics in Brazil is the research developed by Carvalho (1999), who studied the manuals of Methodology of Geography Teaching; and Schmidt (2005) who analyzed the manuals of Methodology of History Teaching. Other studies have been developed, but there are still gaps to be filled in this subject, both in Brazil and in other countries in the Ibero-American context, as pointed out by Guereña, Ossenbach and Pozo (2005).

One of the subjects in which studies have been conducted since the beginning of the 2000s is History. In the wake of Schmidt's works (2005), Urban (2009) analyzed the manuals aimed at History teachers education and emphasizes that the way of thinking about teaching and learning reverberates the context and the time in which the manual was produced. For her, in the case under study, the tendencies to the normatization of the teaching remain with a strong connection with Psychology and Pedagogy, proposing orientations for the teachers to teach from these fields of knowledge.

According to Urban (2009), in relation to the textbooks of Brazilian History Didactics, the focus on the history of History teaching became evident, rather than on teaching and learning processes. She noted that "in manuals, legislations and syllabus aimed at teacher education, elements of the disciplinary code are identified with the idea of standardization, as well as the recovery of the history of History teaching." (Urban, 2009). The discussions in History Didactics have emphasized the need for the teaching of the subject to be based on the science of reference, especially in History Theory, reducing the effects of the presence of Psychology and Pedagogy that was evidenced in the manuals analyzed by the researcher.

In a later study, Rodrigues Junior (2010, 2015) extended the temporal cut, extending the analysis to publications until 2013. The researcher points out that in the case of History, these manuals were designed to propose teaching methods and reflections on the processes of teaching and learning, in order to be constituted as texts of a specific didactics. In his research, the author evidenced the influence of constructivist and interactionist perspectives on the understanding of what learning is; and noted an increase in the number of publications of History Didactics manuals in the last decade.

According to Rodrigues Junior & Garcia (2016), this growth was stimulated by the official programs for the acquisition and distribution of books in the School Libraries Program, which encouraged the production of specific textbooks. On the other hand, the authors verified that among the twenty manuals located between 1993 and 2013 there are different structures. Seven of them could be identified as teaching manuals, in the strict sense, since they have a clear intention to contribute to the initial and continuous formation of teachers, establishing dialogues with teacher trainers, trained teachers or those in the process of education regarding possibilities to teach and learn History.

Analyzing the relationships between these manuals and their contexts of production and circulation, the authors point out that manuals are placed within the "order which they were produced" (Chartier 1998, 8). They also point out that the manuals aim, for different reasons and with different directions, to "establish an order", since all intend to establish a dialogue with History teachers, trained or in formation. They have a deliberate intention to guide the teaching from a more

adequate didactic structure, that allows to organize the work of the teachers from the classic elements of Didactics.

Another group of manuals that has been the subject of research at the NPPD includes books that provide guidance to teachers to teach physical knowledge. In this case, in a research carried out on the manuals of General Didactics and Natural Sciences Didactics, Nascimento and Garcia (2017) claim that it is possible to understand that Physics was considered a necessary and useful knowledge to the development of the students since the first Didactics manuals of the twentieth century.

According to the authors, this research allowed, among other elements, "to understand how general teaching ideas, treated in General Didactics, influence the presence of certain contents and methods in Specific Didactics, in this case Sciences and Physics." (Garcia, Nascimento & Scomacao 2016)

Nascimento (2016) located seventeen works of General Didactics published between 1886 and 1982, in which the authors present the teachers specific guidelines for the teaching of Sciences; if some make only general references to natural phenomena, others suggest topics related to knowledge and physics, such as experiments on liquid density, the phenomenon of rain, how to verify that the air weighs and how to verify the resistance of the air.

From the point of view of Specific Didactics, Nascimento (2016) has located sixteen manuals, published between 1950 and 2014, which include guidance to teachers on how to teach physics knowledge. After the mapping of the works and their general identification, the researcher defined the dissemination of the National Curricular Parameters (1990s), as a temporal cut for the selection of manuals to be analyzed.

The analysis was carried out only on five manuals that present orientations to the teachers of initial grades to teach physics knowledge. The research evidenced that, in the period, this knowledge was valued; they deserved the attention in specific works and not only in the works of Natural Sciences, as it happened until the previous decade. It should be emphasized that these manuals are directed especially to teachers who work in the initial years of Elementary Education who are not specialists in Physics.

According to Nascimento and Garcia (2017), the analyzed manuals point to the constitution, in recent years, of a Physics Didactics that is organized around the didactic elements to structure the teaching of physics knowledge, suggesting topics, procedures and strategies of teaching and evaluation to the teachers. The emphasis was on the constructivist perspectives of learning; experimentation and problematization are valued as a way to stimulate students and develop students' research skills from an early age.

FINAL CONSIDERATIONS

The discussions that mobilize this text allow us to point out that in Brazil there is a long tradition of producing and publishing manuals for teacher education, built since the second half of the nineteenth century. This tradition is related to the concern with teachers formation in the constitution of a public education system, maintained by the State and destined to all, free of charge, laic and mandatory.

Initially destined to the entrance examinations in the magisterium and, above all, to the Normal School during the 19th century, these books were transformed throughout the twentieth century, due to the organization of the school subjects and the institution of teacher education courses at graduate level. This movement allows us to reaffirm the existence of an intimate relationship between the instituted power and this didactic production.

As texts that integrate the complex school culture, proposing ways of working for teachers, these manuals contribute to make explicit references and norms that have built ways of understanding and performing the teaching of a given subject in different historical periods. Therefore, these books are privileged sources for the study of the history of school subjects and the configuration of what has been called here the "disciplinary code".

More recently, teacher manuals have gained an incentive in the presence of a set of public policies aimed at the widest pedagogical literature, which also includes textbooks for students in the different subjects and grades of the school system. The National Textbook Program (PNLD), established in 1985 and which started to undergo evaluation in the 1990s, is now one of the largest textbook assessment, acquisition and distribution programs in the world, including titles.

In the wake of this program, the National Library of the School Program (PNBE) was created, with the function to evaluate, acquire and distribute books for schools, aiming to feed school libraries. Within this program, a specific line was established for teachers, the PNBE-Teacher, a governmental action that allowed the increase of production of manuals for teachers in Brazil, according to the results of the researches carried out.

However, the incipient scientific production of books intended for teacher education contrasts with its wide production and distribution in Brazil. In this sense, the works developed in the School of Education of the University of São Paulo - USP and in the Research Center in Didactic Publications - NPPD of the Federal University of Paraná, which have produced knowledge on this specific theme, stand out. Taking the concept of "pedagogical manuals" it has been possible to identify two privileged lines of studies carried out in Brazil: 1) those that focus on the Manuals of Pedagogy, Methodology and General Didactics; and 2) those which focus on the specific Didactics manuals.

In the case of this text, the research results showed that: 1) the manuals for teachers respond to, in a lesser or a greater degree, the transformations of education in Brazil keeping close relation with the laws and regulations or the normative or political school culture; 2) most of these publications are the result of the accumulated experience of teachers who intend to guide other trained or in-service teachers, and are thus especially enrolled in empirical, practical or material school culture; 3) Finally, these manuals publicize "traveling knowledge" by configuring proper school modes of work in the dimension of scientific or pedagogical school culture.

Thus, it is understood that textbooks intended for teachers, as one of the elements of school culture and a specific type of school life – here understood as a social construction, allow researchers to uncover ways of teaching and learning in different historical and pedagogical contexts in Brazil. New research is underway, whether in historical, epistemological or didactic approaches to contribute to expanding the knowledge in this still lacunar topic.

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A COURSE FOR PRE SERVICE TEACHERS ABOUT TEXTBOOKS AND EDUCATIONAL MEDIA. REVISITING ALAIN CHOPPIN'S PROPOSAL

ERIC BRUILLARD

This text, as a counterpoint to Egil Borre Johnsen's contribution, is a tribute to Alain Choppin. He was not only a brilliant researcher, but also an educator. Ideas he developed some fifteen years ago about teacher training in textbooks are still relevant today. We will briefly present them, explain that the implementation by an association of publishers was unfortunately not of good quality and propose that it might be interesting now to revisit his ideas and consider a specific teacher training course about the ecosystem of educational resources.

INTRODUCTION

The issue of teacher training in textbooks is an old one. In particular, the issue of whether there should be specific training for pre service teachers. Indeed, if training courses are regularly organized to help textbook authors or publishers (for example the one proposed by Arno Reints and Jim Mac Call), training courses designed for all teachers is much more scarce.

A few years ago, at the beginning of twenty first century, Alain Choppin presented such an initiative which he began to implement in a teacher training institute in Paris. This idea was based on two observations.

On the one hand, increased criticism against textbooks encouraged young teachers not to use textbooks anymore and to elaborate pedagogical material on their own. On the other hand, textbooks had changed considerably, offering "a lot of textual and iconographical documents, displayed in "reticular" way, in order to allow teachers to adapt their strategy to groups of pupils which have become more and more heterogeneous". According to Choppin, these evolutions "lead teachers to face serious difficulties, not only in selecting and using new textbooks, but also in helping their pupils to use them" (Choppin, 2005).

DESCRIPTION OF A TRAINING COURSE DESIGNED BY ALAIN CHOPPIN

Alain Choppin organized the resources for his training course in three parts: (1) the textbook and its environment (including statistics, economy, design process); (2) textbooks functions (from different points of view: teacher, pupil, general); (3) selecting a textbook. A historical approach (a thirty-page document) was

also written. He designed a number of activities (21) for trainees, in relation to the second and third parts.

One key idea, according to Alain Choppin, is that teachers have to work on textbooks which are related to subject matters they do not teach. They have to discover how each textbook works, without help from their content mastery. Put in a pupil's position, they should pay attention to material elements they do not usually notice (layout, colours, general structure of the book, typographic variations and so on).

Another important point is to initiate exchanges and promote discussions on textbooks between preservice teachers. The intention is to help develop a common culture on textbooks, including a common language (for example in technical fields as typography).

Alain Choppin taught his course in a teacher training institute for three years and then a publisher association expressed interest in extending this course and developing a computer version.

VERY GOOD IDEAS, BETRAYED BY A PITIFUL IMPLEMENTATION: A CD-ROM DEVELOPED BY SAVOIR LIVRE

A CD-Rom entitled «Le manuel scolaire. Quels choix pour quels usages?» (The textbook. Which choices for which uses?) was then produced by the *Savoir Livre* association on the basis of Alain Choppin's ideas.

To understand what happened, it is important to know what *Savoir Livre* is. According to its website (http://www.savoirlivre.com/), "Savoir Livre is an association run by six school publishers: Belin, Bordas, Hachette, Hatier, Magnard and Nathan. Its objective is to follow the evolution of the education system".[1]

It is worth noticing that the information on this website is very old. For example, in a part called "All about the textbook", a page named "Key figures"[2] explains that "The school sector (textbooks, extracurricular books and pedagogy) represented 11.9% of total publishing turnover in 2004."[3] This data is almost 15 years old! It appears that the latest information was published in 2006, except one page called "Communiqués" (Press releases)[4] which provides some information including press kits. For example, in 2010, the inauguration of the first Master of School and Youth Publishing, in association with the publishing world and a

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[1] http://www.savoirlivre.com/tout-savoir/index.php

[2] http://www.savoirlivre.com/secteur-economique/chiffres-cle.php

[3] Consulted June, 12th 2018 !

[4] http://www.savoirlivre.com/communiques.php

teacher training centre in Bordeaux (not a training course for teachers!). The association is in a way a *false nose* of the main school publishers and is rather dormant, except for some lobbying actions. Nevertheless, *Savoir Livre* had decided to produce the course proposed by Alain Choppin.

I was asked to assess the CD-Rom by *Savoir Livre* and I organized a test (April, 2004) with master students (University of Caen). It was a disaster. Everyone was very disappointed by the product and was faced with problems of usage, navigation and understanding. The prescribed tasks were performed with difficulty. Basically, users considered that it was a kind of "book on the screen", without the advantages of digitization. In the end, the product, in its current form, was considered unusable. An improvement to the CD-Rom did not seem conceivable. It would require a complete redesign including the development of interactive parts, which would have been costly.

It is a pity because everyone recognized the quality and interest of the texts presented. What is said about textbooks is still very little known by the vast majority of teachers.

One may wonder whether *Savoir Livre* (and school publishers) was really interested in developing a course for teachers about textbooks. Producing poor materials was perhaps a good way to prevent this from growing and teachers from becoming aware of the educational resource market and developing better capacities for selecting them.

PERSPECTIVES

As already mentioned, the question arises more broadly about training on educational resources. Indeed, twenty years ago, few education systems let their teachers choose textbooks and educational resources. Things have now changed, notably as a result of the increased supply of educational resources and a more open vision of education encouraging diverse points of view. In order to be better prepared for choosing and using educational resources, it would certainly be very useful to have a more precise vision of their modes of production and possible ecosystems. The question then arises of the content and modalities of such teaching.

Some key elements elaborated by Alain Choppin may be reused: studying educational resources in a subject matter you do not teach, promoting discussion and developing some language in technical fields (hypertext, indexation…), proposing activities for preservice and inservice teachers.

A training course about educational resources could also be linked to the list of standards (Classroom Teaching and Learning Materials,) initially developed by Mike Horsley. This is certainly a new avenue to explore and a task that could be addressed by IARTEM.

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PART 2

MULTIPLE RESEARCH ACTIVITIES AND PRODUCTIONS

C. TEXTBOOKS AND EDUCATIONAL MEDIA PRODUCTION

THE PUBLISHING INDUSTRY AND TEXTBOOKS. A COMPARISON BETWEEN THE UNITED STATES OF AMERICA AND AUSTRALIA

MICHAEL WATT

During the colonial period in both the USA and Australia, most school books were imported from Britain. After the American Revolution (1775-1781) cut off the supply of school books, Noah Webster published *Grammatical Institute of the English Language*, consisting of a spelling book, a grammar and a reader, at Hartford, Connecticut, in 1783, which introduced American content into readers. Although it achieved astoundingly large sales over more than a century of publication, the first edition preceded the advent of the modern publishing industry and mass education. Webster relied on contracting printers in Connecticut, Massachusetts, New York, New Jersey and Pennsylvania to reproduce copies, since transportation facilities of the time were inadequate to publish an edition for distribution nationwide. The appearance of modern practices in textbook publishing was concomitant with the rise of mass education, characterised by graded organisation of formal schooling into classes. It is associated with the publication and marketing by the Cincinnati publishing firm, Truman and Smith, of William McGuffey's *Eclectic Readers*. In 1836, Truman and Smith approached McGuffey, a preacher and teacher at Miami University in Oxford, Ohio, to write a series of four graded readers suitable for the common schools being established in the mid-western states. McGuffey signed a contract guaranteeing a royalty, and provided the manuscripts to the publisher, who engaged sales people to visit the expanding number of schools in the mid-western and southern states. Within a decade, McGuffey's *Eclectic Readers* had penetrated this market, selling at a rate of two million copies each year. Between 1836 and 1890, the series was revised by several editors and passed through seven publishers before being acquired by the American Book Company, which established a monopoly controlling up to 80 percent of the textbook market in the 1890s. This situation prevailed until rivalry from smaller companies opened up the publishing industry to greater competition in the first decades of the twentieth century.

In Australia, the Board of National Education, established in 1848, imported the *Irish National Readers* produced in the early 1830s for use in Irish National schools, because they could be purchased in Dublin at a cheaper rate than in England, but maintaining an adequate supply of readers from Dublin became a continuing problem. Criticism of the inappropriateness of the *Irish National Readers* for the Australian context emerged, and in the 1870s the *Royal Readers*,

published by Thomas Nelson and Sons, which featured the history of the British Empire, were introduced for use in primary grades. By the end of the nineteenth century, Angus & Robertson, founded by Scotsmen, David Angus and George Robertson in 1888, and William Brooks & Co., founded by William Brooks in 1890, had become the principal companies publishing textbooks and basal readers.

In the commentary to a bibliography of research literature on textbooks, Woodward, Elliott and Nagel (1988) concluded that the textbook publishing industry remains cryptic and inaccessible. Little research has been published about the role of authors, the production of textbooks, the influence of the marketplace, and the economics of the textbook publishing industry. The purpose of this article is to compare similarities and differences in the textbook publishing industry in the USA and Australia by reviewing published research literature. The review of an extensive body of research literature on this topic is likely to increase the reader's understanding by presenting a coherent picture concerning complex interactions occurring within the publishing process.

METHODOLOGY

The first step in identifying research literature on the textbook publishing industry was to consult bibliographies published by Woodward, Elliott and Nagel (1988) and Watt (1991). Woodward, Elliott and Nagel (1988) list 65 references consisting of books, articles published in collected works and professional journals, and newspaper articles referring to the textbook publishing industry in the USA. Watt (1991) lists 57 references consisting of articles published in collected works and professional journals referring to the textbook publishing industry in Australia. Searches of the Educational Resources Information Center database and the Australian Education Index were conducted to update the references provided in the bibliographies. Information obtained from citations identified from these searches, covered books, collected works, reports, and journal articles.

Content analysis method was applied to analyse these documents. Once copies of available documents were obtained from library collections, they were read and summaries prepared. These summaries were then organised chronologically, and incorporated into the following commentary. This commentary, which analyses the most significant literature published on the publishing process since the mid-1950s, uses developmental research method to investigate patterns and sequences of change over time.

UNITED STATES OF AMERICA

The publication of research literature into aspects relating to the textbook publishing industry has been sporadic. Major contributions were made in studies

edited by the National Society for the Study of Education in 1931, Cronbach in 1955, the National Society for the Study of Education in 1990, and Altbach, Kelly, Petrie, and Weis in 1991.

An authority on mass communications examined the implications of economic, technological and human factors on the textbook publishing industry in the late 1940s and early 1950s (Schramm 1955). The textbook publishing industry was characterised by being almost entirely controlled by private enterprise, small-scale in its operations, modest in its growth, limited to approximately 75 companies, general rather than specialised, and subject to constant changes resulting from interactions between authors, publishers and teachers.

The managing editor of the American Book Company reported that the textbook publishing industry in the 1950s was competitive, but required large expenditures to be made on editorial departments and promotional staffs for servicing schools (Brammer 1957). Publishers and editorial staff played predominant roles in developing, revising and editing new materials. Greater attention to production techniques had increased the costs of producing materials, and led publishers to employ designers, art editors and production experts. Publishers also maintained large forces of promotional staff for selling, distributing and demonstrating new materials.

A prominent publisher and editor identified that the roles of the main personnel involved in developing, publishing and marketing textbooks were characterised by particular features (Black 1967). The authors of textbooks, generally experienced teachers identified through their prominence in education, offered the endorsement of authorship to the product rather than their contribution to the writing process. The careers of editors were usually limited to editing only a few texts. Large companies employed from 100 to 150 sales people, who covered defined territories, often working with consultants to visit teachers in schools, appearing before selection committees, and gaining expertise about their employers' and competitors' products.

A publishing executive contended that greater uniformity in local education systems resulting from immigration and industrialisation led to the development of a profitable textbook publishing industry that went unchallenged in its processes and products until the advent of the curriculum reform movement, which influenced publishers to match this change by producing products using various media (Jovanovich 1969). Publishers were stimulated into designing high quality textbooks by technological improvements in printing.

An editor for a major textbook publishing company examined the roles of the main personnel and the major stages in the publishing process (Edgerton 1969). Authors were generally discovered by editors at conventions, or by sales representatives reporting back on promising teachers. Contracts between an author

and a publisher were negotiated over a period of time on a flexible basis. The role of the editor involved coordinating a team of authors, illustrators, critical readers, and other participants by evaluating plans, identifying strengths, eliminating faulty practices, and reinforcing the work of the publishing process through four stages: pre-writing; writing and editing; transferring to print; and manufacture and distribution.

From an editor's perspective, the process of developing and publishing textbooks involved interaction between the author, publisher, editorial staff, sales staff, teachers and parents in reaching compromises on various demands (Broudy 1975). The author, who was usually selected by the publisher for a reputation in the field for providing credibility, often contributed little in actual work to the total enterprise. Editors, however, were major contributors to the developmental process, although not often credited as such by the publishing industry. The relationship between editorial and sales departments in many publishing companies was often antagonistic, which inhibited feedback about products being made available to editors from schools.

Eminent English language arts educators reported that increasing operating costs and declining profits led to large publishing companies dominating the textbook publishing industry, and aiming their products at a national market (Squire and Morgan 1990). The process used by large publishing companies to develop textbook programs is dependent on preparing a rationale in advance or a detailed specification for the design and key features, conducting market research, and piloting portions of the text. Authors worked with experienced editors in evaluating this research, and marketing personnel studied textbook programs, as they were developed to interpret likely acceptance by teachers. Following publication, publishers were responsible for training sales and consultant personnel, developing promotional materials, providing professional development for teachers, and planning new editions.

An editor described the three-phase process employed by a large textbook publishing company to develop a new edition of a textbook (Young 1990). The pre-production phase involved surveying market needs and competitive products. The developmental phase involved a production team of authors, subject specialists, consultants, content and copy editors, a photo researcher, an art director, a production manager and sales personnel, overseen by a senior editor, developing the textbook and ancillaries in response to feedback from the education community and special interest groups. The post-production phase involved monitoring the response to the marketing of the textbook and ancillaries for sales' results and feedback about potential changes, and sales personnel developing promotional materials and providing training in the use of the product.

A niche publisher identified that small publishing companies took advantage of opportunities not met by large textbook publishing companies (Carus 1990). The

most important opportunities were taking advantage of the effects of the education reform movement, and the ineffective bureaucracy or management changes in large publishing companies resulting from takeovers. On the other hand, small publishing companies faced difficulties in affording sufficient sales staff to cover the market, applying computer technology, responding to changing attitudes resulting from the impact of various minority groups, and applying resources to current educational research in order to improve their products.

Eminent social studies educators described a hypothetical case history of a typical niche publishing company (Hawke and Davis 1990). Having usually been employed previously in education or publishing, niche publishers were motivated by both profit making and a commitment to improving education, but rarely had experience in all aspects of the textbook publishing industry. Often small publishing companies were profitable initially, whilst the entrepreneur did most of the work, but expansion needed to compete in the marketplace led to niche publishers taking financial risks. Sometimes, a larger competitor adapted a niche publisher's product, which led to a takeover, but bankruptcy was a more common outcome.

Eminent English language arts educators examined the application of the publishing process to develop reading materials. A review of the historical development of reading materials showed that they played a central role in the evolution of the textbook publishing industry (Chall and Squire 1991). As well as the roles played by publishers, authors and consultants in developing reading materials, academics, research and development laboratories, test developers, commercial developers and teachers contribute to the publishing process. A basal reading program, which could consist of as many as 200 components, is likely to be developed over several years at a cost ranging from $15 million to $35 million, but yield a profit only in the order of 10 percent.

A prominent testing expert argued that the effects of corporate mergers within the textbook publishing industry by foreign and domestic competitors were similar, but the advantages and disadvantages of takeovers were difficult to assess (Rudman 1990). Whilst mergers led to restructuring into more efficient and competitive companies, the greater concentration of financial resources may lead to a less competitive business environment. The restructures caused by mergers also had profound effects on the lives of employees. Dismissed as a consequence of mergers, many former employees became involved with small publishing companies, whilst employees, who were retained, often lost their commitment to company loyalty. Corporate mergers also contributed to a move away from contracted authorship to in-house production of textbooks and tests by editorial teams, which may have compromised accountability and thereby affected the quality of the products.

Prominent textbook reviewers reported that macro-economic globalisation during the 1980s affected the textbook publishing industry as independent publishers were acquired by large, multinational media, communications and entertainment conglomerates (Sewall and Cannon 1991). Whilst five large publishing companies dominated the national market, a few, middle-sized, regional publishing companies established pre-eminence in particular subject areas, but small publishing companies were usually restricted to publishing supplementary materials. The restriction of the marketplace to fewer competitors was also matched by the increasing cost of producing a national textbook program across the elementary grades, estimated to be as high as $40 million. Whilst this outlay may realise margins of 10 to 20 percent, it was likely to take many years to recover.

The director of the American Textbook Council argued that the increasing concentration of the textbook publishing industry in the hands of four large companies has reduced the quality of textbooks. Many independent publishing companies have been absorbed as brand names within four large companies, which have strong global ambitions with interests in other areas, such as the publication of journals and the book trade (Sewall 2005). Large publishing companies apply several strategies to control the relatively small number of volume buyers. They lobby state selection committees in large adoption states to obtain lucrative markets, acknowledge the requirements of state standards of large adoption states in the content of textbooks, attempt to satisfy the preferences of pressure groups, thereby homogenising the content of textbooks, and use a writing-for-hire production system to reduce costs.

AUSTRALIA

The publication of research literature into aspects relating to the textbook publishing industry has been sporadic. Major contributions were made in studies edited by Lyons and Arnold in 2001, and Munro and Sheahan-Bright in 2006.

A history of the publishing industry in Australia from 1891 to 1945 reported that state education agencies played an important role by publishing school papers for use as supplementary reading materials as well as sets of readers adapted from English readers (Prentice 2001). Angus & Robertson and William Brooks & Co. were the main Australian publishers that dominated the textbook marketplace. The former published the *Australian School Series* of textbooks covering every subject in the curriculum, and the latter published *Brooks' Australian School Books*. The British publishers, Cassell, Macmillan, Oxford University Press and Thomas Nelson made considerable inroads into local textbook publishing through their Australian branches as did the New Zealand publisher, Whitcombe & Tombs.

A history of the publishing industry in Australia from 1946 to 2005 reported that Australian publishing companies first began producing textbooks for secondary schools after World War II, replacing the prevailing practice of importing textbooks from Britain (Blaxell and Drummond 2006). State education agencies were the main developers of materials for primary schools during this period. In the 1970s, publishing companies from the USA became involved in publishing in Australia, and by the late 1990s the publication of materials for schools was almost exclusively in the hands of foreign companies. During this period, the first niche publishers representing small independent companies, often established by former teachers or employees of large publishing companies, established a precarious hold at the margins of the marketplace.

The marketplace for publishing textbooks became increasingly concentrated in the 1990s with six foreign publishing companies controlling most of the output and turnover (Wilson 1993). As a result of takeovers in the 1970s and 1980s, each publisher produced a number of imprints representing ownership by a previous company. Publishers conducted market research, displayed materials at conferences, sent sales' representatives to schools, and review copies were distributed throughout the education system. Most states had book-hire systems that allowed schools to buy in bulk and hire materials to students.

CONCLUSION

While the collective body of research literature on the textbook publishing industry in the USA presents a comprehensive set of research findings on this topic, research literature on the Australian context is characterised by limited findings concerning the textbook publishing industry in Australia.

The examination of research literature has identified that the main facets of the textbook publishing industry in the USA arose in the early nineteenth century. Since that time, specific roles for authors, editors and sales people have emerged in the publishing process, and new technologies in printing and new media in products have modified the publishing process. More recently, corporate takeovers and mergers in the textbook publishing industry have created particular places for large companies and newly emerging small companies in the market; the former have appropriated the function of national publishers, whilst the latter operate as niche publishers.

The findings from the limited research conducted into the textbook publishing industry in Australia suggest that its practices derived from the British publishing industry. Australian publishing companies gained a place in response to the market's need for textbooks that demonstrated Australian content. The advent of American publishing companies within the Australian marketplace from the 1960s was marked by a policy of acquisition. By the 1990s, the Australian textbook pub-

lishing industry had become increasingly dominated by a small number of foreign publishing companies, thereby closely reflecting the American marketplace.

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PUTTING THE PEDAGOGY ON THE PAGE: THE ROLE OF THE TEXTBOOK IN LOWER-INCOME COUNTRIES

ANDY SMART

Textbooks generally play a more significant role in classrooms in lower-income countries than in higher-income countries. Teachers who have completed less schooling and had less or no initial teacher education tend to depend on textbooks more than teachers who have had more initial teacher education. Furthermore, teachers in lower-income countries are often required to 'cover the textbook' and have less time to design their own teaching methods.

Given that most education specialists – whether policy-makers, local education authorities, or school leaders – believe that the methodology of teaching, supported by the teacher's subject knowledge, is a critical factor in an effective teaching-learning relationship, it is surprising that textbooks in most lower-income countries lack a transparent methodology based on a well-grounded theory of subject-based learning. While research into 'textbook effectiveness' is inconclusive, research into the relationship between pedagogy and improved learning outcomes has much to offer to textbook writers, in both lower- and higher-income countries.

In classrooms around the world the textbook plays a central role in structuring the teaching and learning process.[1] This is a characteristic of lower-income countries[2] as well as of many higher-income countries.[3] In most lower-income countries, the textbook – sometimes accompanied by a teacher's guide – represents the complete syllabus. In some lower-income countries, the textbook is

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[1] 'The curriculum is the key reference point for teachers, particularly in developing countries, where it is encoded in the official textbook and teacher guides, often the sole resource used by teachers.' In Jo Westbrook et al, 'Pedagogy, Curriculum, Teaching Practices and Teacher Education in Developing Countries' (DFID, 2013)
http://eppi.ioe.ac.uk/cms/Portals/0/PDF%20reviews%20and%20summaries/Pedagogy%20 2013%20Westbrook%20report.pdf?ver=2014-04-24-121331-867

[2] This paper uses the term 'lower-income country' instead of 'developing country', which is a more widely used term but implies a single, standard developmental path that all countries follow or should follow.

[3] For example: 'Printed textbooks are widely used as the main resources in teaching and planning especially in basic education level (first nine years of education) in Finland. In reality, they are used so widely that it is not uncommon for teachers to rely on textbooks rather than on the official curriculum.' Pudas, A-K, 'Investigating possibilities to develop textbooks to implement global education in basic education instruction', *IARTEM e-Journal* 2013, Volume 5, No 2
http://biriwa.com/iartem/ejournal/volume5.2/papers/Paper1_Pudas_Developing_Textbooks_Global_ Education_Vol5_No2.pdf

known as 'the curriculum' or 'the syllabus'. For financial reasons, the textbook may be the only learning material that children are exposed to, even when they are still learning to read and should have access to a wide range of reading materials. The textbook therefore represents the only teaching resource and the only learning resource. Consequently, the textbook comes to be seen as a set of statements to be memorised, which fails to promote any higher-order thinking.[4] This link between learning and memorisation is reinforced when the curriculum is too demanding and the language of the textbooks is considerably above the learners' reading level. The poor alignment between content, language and learner may be the result of the curriculum and textbook writers' lack of classroom experience. In such a situation, the teacher – confronted with a textbook that most students cannot read and a classroom that is overcrowded and poorly resourced – resorts to a methodology of drilling sentences that have not been understood. In the annual exam, the unfortunate student will then turn the pages of the textbook in their mind in order to retrieve the correct words or sentences. This is an approach that can be described as neither student-centred nor teacher-centred, but 'textbook-centred'.

Although a textbook cannot fully compensate for a curriculum that is too dense or too advanced for the students, through an appropriate pedagogy and considerations of students' actual reading level, the textbook *can* have a positive – rather than negative – impact on teaching and learning.

WHAT DOES THE EVIDENCE SAY ABOUT THE RELATIONSHIP BETWEEN TEXTBOOKS AND LEARNING IN LOWER-INCOME COUNTRIES?

In lower-income countries with limited resources and greater challenges across the entire sector, improving national educational outcomes is immensely difficult. Many curriculum and textbook writers in such countries usually have less exposure to alternative models and surprisingly little experience of classroom practice in typical government schools. As a result, when a new curriculum is introduced, there is a tendency for textbook writers towards isomorphism – that is, to make only minor changes to the existing textbooks. Even where the Ministry of Education intends a major curriculum shift, there is less attention to how the textbooks might reflect this shift. The curriculum writers may refer to examples of curricula from other countries but the textbook writers have little knowledge of textbooks from other countries.

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⁴ Dundar et al: 'A great deal of what South Asian students are taught is "procedural", or rote-based. This means that most pupils cannot answer questions that deviate even slightly from the textbook or what was presented to them in class.' Dundar, H., Beteille, T., Riboud, M., & Deolalikar, A. (2014). *Student Learning in South Asia: Challenges, Opportunities and Policy Priorities*. Washington, DC: World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/18407/882670PUB0 978100Box385205B00PUBLIC0.pdf

Although textbook writers in lower-income countries have little access to examples of textbooks from other countries, we might expect them to be able at least to access research into the characteristics of textbooks for different subjects, cycles and contexts. In fact, research into textbook effectiveness, whether in higher- or lower-income countries, is still at an early stage.[5] A 2017 study of the US textbook sector found that 'A critical factor limiting the capacity of school administrators to choose more effective textbooks is that there is virtually no evidence on how different textbooks affect student achievement'.[6] The same study also reported that 'One of the most common questions we get when we present this work is, "What is it about [California Math] that makes it effective?" As of now, there is simply no way to know the answer to this question.'

Despite the huge economic value of the global textbook industry, the products of this industry are not based on research. For educational publishers in the private sector, an 'effective' textbook is measured in terms of its commercial success. Like any other commercial publication, the sales of the book represent its popularity. Since customers know what they want, a textbook that sells in large numbers is therefore 'effective'. This kind of evidence is not valid for a textbook writer employed by the Ministry of Education in a lower-income country.

Many countries – both higher- and lower-income – make use of criteria to evaluate various aspects of a textbook and to approve it for use in schools. There is an assumption that this process of evaluation is valid because it is carried out by, or on behalf of, the funding institution. The criteria are not based on research. In any case, the criteria generally focus on the factual content of the textbooks, rather than their methodology. The textbook is an official document and therefore must represent a set of values as well as covering the curriculum. The evaluation process therefore has little to say about 'what works'.

Research in lower-income countries is – unsurprisingly – even more limited. It should be noted that such research is often carried out by education economists on behalf of global development agencies, for whom the provision of textbooks (along with other inputs such as teachers, classrooms, etc) is considered a contribution to the 'quality' of education. Quality in this sense signifies those educational inputs that have an impact on learning, in contrast with expenditure on salaries and school buildings. For many education economists, the value of the textbooks

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[5] One of the most interesting areas of research between textbooks and learning is in the field of Mathematics. In 2014, an inaugural international conference on Mathematics textbooks took place at Southampton University: https://www.sbm.org.br/icmt2/

[6] Evidence Speaks Reports, Vol 2, #5 January 5, 2017 https://www.brookings.edu/research/big-bang-for-just-a-few-bucks-the-impact-of-math-textbooks-in-california

There are also contrary reports, such as Thomas Kane, 'Never judge a book by its cover' https://www.brookings.edu/research/never-judge-a-book-by-its-cover-use-student-achievement-instead/

is often considered in terms of their cost and availability. Nevertheless, decisions about large-scale funding to education sectors in lower-income countries are made on the basis of such reports.

If we briefly probe the evidence for textbook effectiveness in lower-income countries, as cited by education economists, it does not reveal much. For example, as part of its role in monitoring national education systems, UNESCO publishes a regular Global Education Monitoring (GEM) Report. In 2015, the GEM Report Policy Paper stated that 'a World Bank study has shown the negative impact on learning to be far more significant when moving from a ratio of 1:2 to 1:3.'[7] The wording – 'far more significant' – suggests that three students who are sharing a textbook are much worse off than students who have one textbook between two. The GEM report says little else about textbooks. For the reader, the take-away message – which is not unreasonable – is 'the more textbooks the better'.

The World Bank study that is quoted by the GEM report was also published in 2015.[8] It stated that 'a study for the Philippines showed that the decline in the impact was relatively small when moving from a ratio of 1:1 to 1:2, but more substantial when moving from 1:2 to 1:3.' The message of the World Bank study is therefore the same as that of the UNESCO study, if a little more nuanced: the wording is 'more substantial' rather than 'far more significant'.

Turning to the study for the Philippines quoted by the World Bank study, we find the statement that 'An often-quoted experiment in the Philippines suggests that when schoolbooks are the property of the school and not taken home, only a marginal difference exists between ratios of 1:1 and 1:2. *Some experts have suggested* that a ratio of 1:3 should be regarded as satisfactory' (italics have been added).[9] So we are nearer to the original source for this evidence. When we finally arrive at the original source, the experts referred to were merely claiming – based on their own experience, rather than on any formal studies – that 'an average text-book to student ratio of 1:2 or 1:3 should be regarded as satisfactory'.[10] By retracing these references, it may be argued that common sense has been elevated to the status of evidence merely by being recycled several times.

This diversion through examples of evidence regarding the impact of raw quantities of textbooks can also be applied to the relative quality of the textbooks.

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[7]   'Every Child Should Have a Textbook' http://unesdoc.unesco.org/images/0024/002433/243321E.pdf

[8]   Birger Fredriksen et al, *Getting Textbooks to Every Child in Sub-Saharan Africa* (World Bank, 2015)

[9]   *World Bank Support for Provision of Textbooks in Sub-Saharan Africa 1985–2000*

[10]   Brunswic and Hajjar, *Planning textbook development for primary education in Africa* (1992)

One of the most frequently referenced studies was carried out in Kenya by Glewwe, Kramer and Moulin[11], which found that 'Textbooks did increase the scores of the best students (those with high pretest scores) but had little effect on other students'. However, the authors of the study themselves qualified their findings by noting that although the language of the textbooks was the official language of instruction, in actuality students in grade 4 of Kenyan government schools are still reading at a very low level of English.[12] This otherwise robustly designed randomised control trial (RCT) was therefore conducted in a highly specific context where students are learning in a second language, which had a significant impact on their ability to read the textbooks. The Glewwe et al research demonstrates that many factors need to be considered in any attempt to arrive at generalisable statements that can be applied in other contexts. Indeed, it raises the question of what conditions *would* be necessary in order to conduct an RCT that could be in any sense generalisable and of value to policy-makers, and even to publishers and textbook writers.

Some development economists have begun to take a more balanced view of textbook effectiveness and of the notion of evidence in general. For example, Lant Pritchett also refers to research by Glewwe:

> First, many common sense, widely accepted, and likely true, facts about education are not proven, or even appear contradicted, by 'the evidence'. For instance, Glewwe and Muralidharan (2015) report on four wellidentified estimates of the causal impact of providing textbooks in cases where textbooks were not available to every student. Each of them show that the causal impact on learning of the typical child of additional textbooks is zero (or that the hypothesis tests fail to reject zero). So 'the evidence' would conclude there is no, or weak, evidence for the universal (and almost certainly correct) practice of seeking to provide a textbook for every child. [13]

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[11] 'Many Children Left Behind? Textbooks and Test Scores in Kenya', American Economic Journal: Applied Economics 2009, 1:1

https://www.povertyactionlab.org/sites/default/files/publications/33%20Textbooks%20Kenya%20Jan%202009.pdf

[12] The language of instruction in grades 1-3 in Kenya has officially been students' own mother tongue. In practice, almost all schools have taught in English. (There are estimated to be over 40 languages in Kenya.) See http://www.eajournals.org/wp-content/uploads/Language-of-Instruction-in-Kenya-Focus-On-Lower-Primary-in-Schools-in-Rural-Areas.pdf

[13] Lant Pritchett, *"The Evidence" About "What Works" in Education: Graphs to Illustrate External Validity and Construct Validity* (Center for Global Development, June 2017). https://www.cgdev.org/publication/evidence-about-what-works-education-graphs-illustrate-external-validity

Pritchett continues:

The use of experimental evidence is often promoted by an analogy to the assessment of pharmaceuticals, where double blind randomised control trials are the 'gold standard' often insisted on by regulatory agencies to approve new drugs. But no one in medicine asks the question, 'Do drugs work to fight disease?' as it is obvious the question lacks construct validity What drug (in an exact chemical specification that can be reproduced globally)? In what dosages (in exact and replicable amounts and timings)? Given in response to what observable diagnostic indicators? But people do, unfortunately, write systematic reviews about 'the evidence' on 'what works' in education without any of this specificity on the instances of each class.

To date, therefore, the evidence for textbook effectiveness has been a slippery concept. Fortunately, there is an alternative way of addressing the issue.

TEXTBOOK CONTENT AND TEXTBOOK PEDAGOGY

While the mere presence of textbooks is not enough to make a difference to learning outcomes, a well-planned textbook that supports good pedagogical practice can help systems and teachers who seek to move away from rote-learning towards teaching and learning that is more engaging and effective. This is supported by research as well as by practice. We have noted that at the system level, textbooks are usually evaluated on the basis of content rather than methodology. System managers are public servants with a responsibility to ensure curriculum relevance, factual accuracy and the avoidance of socially negative content. On the other hand, in countries where there is a choice of textbooks, teachers themselves tend to judge textbooks on their methodology: the teacher seeks a textbook that supports the way they teach, because they believe it works. There is therefore an essential link between the methodology of the textbook and the teacher's own practice.

A wide range of studies is now available into the elements of effective pedagogy, both in higher- and lower-income countries. Meta-surveys have found that a focus on the structuring of pedagogy is one of the most important factors in improving learning in lower-income countries[14], in which teachers 'make use of a range of strategies including talking to the whole class from the front, question and answer with the whole class, individual exercises or reading, group discussion and

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[14] For example, 'The impact of education programmes on learning and school participation in low- and middle-income countries', carried out by 3ie (the meta-survey described itself as 'the most comprehensive systematic review of education programmes conducted to date' in South Asia, East Asia and the Pacific), reported that 'Programmes using structured pedagogy to change the classroom environment had the largest and most consistent positive effects on learning' (in Snilstveit et al, p2, 7 September 2016) http://www.3ieimpact.org/media/filer_public/2016/09/20/srs7-education-report.pdf

practical activities.'[15] These strategies can be promoted through the textbook in an approach that is both learner-centred and teacher-centred.

One reason for this is the generally limited opportunities in lower-income countries for students to properly engage with learning in systems that depend on the so-called 'transmission' approach. Glewwe reports that:

> In most developing countries, the 'technology of instruction' has remained unchanged for decades, and consists of teachers using a 'chalk and talk' method to teach a classroom of students. Classroom time is typically spent in a 'lecturing' style starting from third grade, with students expected to follow the textbooks. … the focus is on completing the materials in the syllabus – typically specified in government-approved text books, with the goal of being able to answer questions and problems provided at the end of the chapter – which in turn will be tested in low- and high-stakes examinations.[16]

In India, Rukmini Banerji's observations echo those of Glewwe:

> In a typical Indian classroom … the textbook anchors all activities. The usual teaching-learning process is entirely driven by 'chalk and talk' and geared to 'completing the syllabus' and finishing the textbook rather than ensuring that children learn.[17]

In the light of such observations, several researchers have compared educational interventions by aid-funded projects and found that initiatives targeting pedagogy are among the more successful. A meta-survey by Westbrook et al found[18]

> It is when teachers see pedagogy as a kind of communication with students that their teaching practices become meaningful, leading to positive outcomes for their students. Three strategies have been identified from a number of studies that prioritised communication with students and were inclusive in nature. Those three strategies are: teachers giving feedback and paying sustained and inclusive attention to all students; creating an environment where students feel safe; and teachers drawing on students' backgrounds in their pedagogic discourse.

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[15] 'Initiatives to improve the quality of teaching and learning: a review of recent literature' (Barret et al / EDQUAL, 2008) https://www.edqual.org/publications/workingpaper/edqualwp11.pdf/at_download/file.pdf

[16] http://www.bsg.ox.ac.uk/sites/www.bsg.ox.ac.uk/files/documents/RISE_WP-001_Glewwe_Muralidharan.pdf, p48

[17] 'How Do Systems Respond to Disruptive Pedagogic Innovations? The Case of Pratham in Bihar', RISE Working Paper (October, 2015)

[18] Jo Westbrook et al, 'Pedagogy, Curriculum, Teaching Practices and Teacher Education in Developing Countries' (DFID, 2013) http://r4d.dfid.gov.uk

These strategies lead to teachers using six practices in a communicative way, identified from one or more study and associated with positive outcomes:

- demonstration, explanation drawing on sound pedagogical content knowledge;

- flexible use of whole-class, group and pair work where students discuss a shared task;

- frequent and relevant use of learning materials beyond the textbook;

- open and closed questioning, expanding responses, encouraging student questioning;

- use of local languages and code switching;

- planning and varying lesson sequences.

Some observers may doubt that such a western, student-centred pedagogy is applicable in the typical classroom conditions of lower-income countries. In response, another meta-survey produced for DFID by a team from Sussex University found that 'a smaller number of studies recognised that practices labelled as teacher-centred do not necessarily render the student powerless or passive … and furthermore, labelling or describing pedagogies in dichotomous terms is not useful'.[19]

In other words, the pedagogical approach may be considered as a continuum in which effective teaching and learning lies in a combination of teacher-centred and student-centred activities. While the 'sweet spot' may shift, the pedagogy needs to find an appropriate balance of teacher-centred and student-centred, whatever the classroom context. Although many factors including the teacher's background and the overall cultural context may impact on the identification of this 'sweet spot', communicative, cognitively-demanding teaching is an essential factor. This is the kind of pedagogy that textbooks in lower- and middle-income textbooks can seek to support.

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[19] Westbrook et al (ibid).

TEXTBOOKS AND THE VELVET REVOLUTION. REFLECTIONS ON PUBLISHING IN THE FORMER SOVIET UNION AFTER 1990

JAMES MCCALL

THE ORIGINS OF THE PUBLISHING REVOLUTION

The revolution in textbook publishing which took place in the Former Soviet Union in the early 1990s was unprecedented. This was a time when authors, editors and publishers had to re-think their notions about what a textbook is and how it should be used. I was fortunate to be involved in a small way in the development of this textbook 'revolution' as an adviser to various Ministries of Education in the region, working for a UK international publishing consultancy on education reform projects funded by donors such as the World Bank and aid organizations including the UK's Department for International Development. What follows are my reflections on the changes which took place then, and which continue to resonate in the area of textbook publishing to the present day.

With the collapse of the Soviet Union, each individual republic became responsible for its own affairs across the entire spectrum of activities – the economic, legal, and educational sectors being some of the most significant ones. In the educational sector, state publishing was gradually superseded by private sector involvement in the publishing process in many of the former Soviet states. This created an opportunity for a new breed of publishing entrepreneurs. Some of them had previously been employed by the old state monopolist publishing house and were essentially civil servants. Under the old system, each government ministry would have its own publishing department or publishing house, responsible for writing and producing books relevant to its own particular specialism, whether that was education, agriculture or health.

There was no part of the publishing process which was unaffected by the disappearance of the state centralist publishing model. Authors, editors, accountants (or their equivalent), distributors – all of them had new tricks to learn. Some took to the changes more readily than others. Broadly speaking, change came more easily to younger employees who had less experience, certainly in their working lives, of state centralism and its ramifications. This was the generation which supplied the skills to build new private companies to challenge the old state monopolists.

THE CHALLENGE FOR AUTHORS

Where should you start when looking at this textbook revolution? The best place is at the writer's desk – with the author, whoever he or she might be. The question of authorship loomed large in any discussion about developing textbook systems. Here there are issues which are not purely to do with publishing practices but relate just as much to cultural differences and sensitivities. In some countries in the Former Soviet Union, deference was (and sometimes still is) given to the age and experience of authors where such allowances were inappropriate. The commonest of these is an exaggerated regard for academic qualifications. A professor of mathematics at a late stage in his career is not best placed to write textbooks for grade one primary school children, in whatever country or continent. There was sometimes a reluctance on the part of older writers to allow a younger generation of authors and teachers to become involved in writing textbooks.

This is sometimes because age in itself attracts respect and in other cases because experience in itself is taken to be some kind of guarantee of quality, both in writing and also perhaps in teaching. Where such attitudes are supported by tradition or cultural and religious beliefs, it can be difficult to introduce what might be termed European ideas of expertise where hierarchy is less important than knowledge and demonstrable skills.

Payment for authors was also a consideration. Authors' remuneration was often based on the number of words they produced, so verbosity was encouraged, often at the expense of relevance. What was the incentive to produce sharp and clear prose when you could be paid more if you wrote more? The alternative, a royalty-based system where authors are rewarded according to the number of copies sold, was at least initially a practice to which authors were not at all accustomed.

MARKETING – A BLACK ART?

Prior to the arrival of private sector publishers on the scene, marketing was one of the black arts which no one understood – because they didn't have to. In a monopoly situation, there is no need for marketing because there is no competition – and if there is no competition, you do not have to prove that your product is better than anyone else's. So both producers (the new publishers) and the consumers (the newly established independent Ministries of Education) had to learn what marketing was all about.

Some of the key players adjusted to this requirement quickly, while for others it took a little more time. Marketing was still seen as being somehow unworthy – your product should sell without any great effort on your part because quality speaks for itself. New publishers quickly learned that this way of thinking was no

longer enough. They became accustomed to alien notions such as market share – and found that success lay in increasing your share of the market, at the expense of your rivals.

This did not always come easily – gaining an advantage on your competitors, either by producing cheaper books, or more attractive ones, or ones which raised the quality of learning outcomes was regarded in some quarters as somehow improper. The idea of competition in the publishing sector was inevitably an alien concept. Accustomed to decades of state centralism, editors in the old state publishing houses who were attracted by the idea and the principles of the market economy had to move quickly – and learn fast. But any misgivings were purely temporary; soon competition caught hold and for some publishers good profits were feeding their enthusiasm.

NEW IDEAS ON PRODUCTION AND DESIGN

Production and design were also areas where changes took place. The soviet system depended heavily on 'state standards' – a set of technical specifications which were mandatory and which in effect placed limits on the materials to be used in book production and laid down guidelines for basic principles of design. Textbooks were expected to run to a specific number of pages. Paper had to conform to a specific grammage. After a certain number of pages, it was expected that the book would be in hard cover rather than paperback. For the most part there were few, if any, good publishing reasons for such restrictions. Once the new private publishers began to bid on a competitive basis for the supply of textbooks, however, state standards became less relevant. Publishers made decisions based on economy, or attractiveness, or readability, or price – more in line with what might be seen as normal Western practices.

DISTRIBUTING BOOKS TO SCHOOLS

The distribution of textbooks to schools under the old state centralist system was an enormously demanding operation. Books were produced centrally and sent out to all parts of the Soviet Union. The system did not guarantee equity of provision, but it did attempt to provide a comprehensive coverage, even if that was not always achieved in practice. Since publishing is an essentially holistic activity, with each part of the book chain dependent for its success on the performance of the other links in the chain, effective distribution was just as important as skills in authorship or editing.

New systems of distribution had to be introduced in each country since there was no longer any control from the centre. Where private sector publishing dominated, every publisher had to make its own arrangements for the distribution of

books to schools, or to the warehouse of the local ministry of education. This was no easy task since publishers themselves had no direct experience of how books should best be distributed to schools. Sometimes books would be sent to the schools directly, and in other cases delivered to the nearest town or village. From there, self-help and the involvement of local transport would occasionally come into play.

FROM CENTRALISM TO THE MARKET: A NEW PUBLISHING MODEL

Central to all these changes was the transition to a market economy. At the same time, great importance was attached to the best method of making textbooks available at prices which the government, or parents, could afford. School textbooks had traditionally been very cheap, but at the expense of quality and durability. It was not unusual for books to become worn and torn after as little as six months. If, however, the quality was to be improved, there would be a resulting increase in cost.

This was one of the first dilemmas faced by the new generation of private publishers. The removal of subsidy from state publishing houses and the emergence of other smaller publishing houses introduced an element of competition to the publishing industry and, as a consequence, a degree of choice for the consumer. This was at a time when prices were escalating and a lack of possible sources of investment placed severe constraints on growth.

These were hard times for the old state monopolist publishers. From having a clear and unquestioned right to produce everything which schools needed, they moved to a situation where the quality and relevance of what they produced was scrutinized, not just by the users but also by those donors who provided financial support to the new national Ministries of Education.

TEXTBOOKS AND THE CURRICULUM

The development of educational publishing is inextricably linked to the process of curriculum reform, since teachers require textbooks which reflect the latest syllabus developments and publishers require to base their future plans for new titles on the guidelines which are available to them. The importance of collaboration between curriculum policy makers and the producers of teaching materials cannot therefore be over-emphasised. This was yet another aspect of the rapidly changing relationships within the publishing sector.

Where grants or loans were made available by international donor organizations to Ministries of Education to enable the purchase of textbooks in large quantities, fledgling publishers who established new companies to supply these materials were sometimes required to meet certain criteria – they might be asked to prove that

they had the necessary skills, capable editors and a suitable office in the country concerned. Ironically it was sometimes easier for newcomers to meet these conditions than for the old state monopolists who were often over-manned, with a cumbersome bureaucratic structure.

CHOOSING THE RIGHT TEXTBOOK

The consumers (teachers, for the most part, or local education officials), who could be faced with the challenge of choosing between alternative textbooks, also experienced a conflict of emotions. Of course, it was good to have a choice, if the Ministry made it available. But on what grounds was one book to be favoured rather than another? For both teachers and Ministries, the idea of selecting textbooks based on an external set of evaluation criteria was in itself a challenging one.

Added to this was the question of how textbooks should be judged. To make decisions on price alone was clearly inadequate. But what other criteria should come into play? Questions of gender balance and green issues now came into the equation.

Twenty five years or more have passed since this velvet textbook revolution. Some countries of the Former Soviet Union went on to develop an efficient and impressive textbook publishing system, with the help, at least initially, of foreign advisers and a degree of financial support from donor organizations. Perhaps the Baltic States provide the best examples of how a centralist system can be revolutionized to produce a publishing sector on a par with anywhere else in Europe. Several publishers from these countries have had outstanding results in the Best European Learning Materials Awards in recent years. In that sense, the revolution is complete.

NOTES AND REFERENCES

1. There is very little published material or research available on the transition from state centralism to the marketplace in learning materials provision. This is partly because the publishers concerned were pre-occupied with establishing themselves as independent companies and had little time to record the many different challenges and tasks which were facing them. In terms of academic research, Publishing Studies in the early nineties was still a relatively young discipline with the emphasis on teaching at undergraduate and postgraduate level rather than on research itself (though this was, of course, to change later).

2. The main body of relevant work lies in the many reports commissioned by donor agencies covering the transition to the market in many of the former Soviet republics and the satellite countries of Central and Eastern Europe. The textbook publishing industries of Bulgaria and Romania were amongst the first to attract the attention of the donor community. In these countries the work was carried out for the most part by independent consultancies with a specialisation

in educational publishing systems. The most prominent of them at that time was probably International Book Development (IBD), a small but highly influential UK-based organization with whom the present author was closely associated. The various reports which were produced were comprehensively disseminated within the publishing and educational systems of the countries concerned, but did not receive a significantly wider circulation.

3.   Much of the material in this paper is based on personal observation and experience, drawing on meetings and discussions with key players in Ministries of Education, publishing houses and donor organizations. The period which was of the greatest significance for researchers and historians stretched roughly from 1991 to the end of that decade.

TEACHERS AS AUTORS OF THEIR OWN MATERIALS. UTOPIA OR REALITY?

JESÚS RODRÍGUEZ RODRÍGUEZ

CONTEXTUALIZATION

In this chapter we aim to highlight the need for considering the elaboration and adaptation of the curricular materials by teachers themselves as a complement or alternative to using textbooks. We have already analyzed this possibility in earlier IARTEM publications (see, for example, Rodríguez Rodríguez, 2011) as well as previous congresses and papers (Rodríguez Rodríguez, 2006a, 2006 b). We consider this option a magnificent opportunity for reconsidering the activities related to the design and evaluation of materials in order to contribute to the territorialization of education. We realize that this is sometimes considered "pedagogical utopia" and that it is difficult to conceive of teachers elaborating their own resources . "Pressure" by publishers, the lack of adequate promotional measures, the lack of time, the lack of knowledge or professional support are factors that help to explain the scarce production of materials by teachers themselves. But the facts also show that this "desirable" reality is possible and numerous examples have studied studied of activities confirming that it is clearly feasible (See for example Castro Rodríguez, Rodríguez Rodríguez, Zapico Barbeito, 2013) .

It should be noted that our proposal in no way intends to be exclusive. As emphasized in Rodríguez Rodríguez (2006b), we are aware that making generalizations insofar as the production of own materials is currently almost unimaginable. Moreover, in addition to perhaps being impossible, a change by teachers in this regard may also be out of touch with reality. For the short term at least, it seems highly unlikely that our teachers will focus part of their time at school to developing own materials, reject "practical" publisher materials, modify the processes of editorial production, stop choosing their materials based fundamentally on publisher decisions, and stop "taking advantage" of free promotional materials. But it is no less true that we are currently experiencing a crisis in teacher professionalization and a de-contextualization of teaching-learning processes (See Rodríguez Rodríguez and Castro Rodríguez, 2007). Any measure that can help us to "recover" this space is more than welcome.

A new conception of teachers elaborating or co-elaborating their own materials implies a new professional context requiring new professional relationships both within and among schools. In turn, this would affect relations between institutions and involve a new way of understanding teacher decisions in this area. On

the other hand, the idea of a teachers producing materials is very much in keeping with the idea of innovative teachers as reflective professionals who questions their own activity (Elliot, 1989, Stenhouse, 1987, Travé, González and Pozuelos, 1999). These teachers are "builders" of the curriculum who do not merely accept materials that are defined by outside sources that "impose" a certain way of understanding the curriculum.

Reflections regarding the process of producing teachers' own materials has parallels with the debate in the literature concerning materials conceived from a technical perspective and those conceived from a practical perspective. A review of reflections on this issue may help demonstrate the need for teachers to elaborate their own materials.

Curricular materials from a technical and practical perspective. Concepts regarding the production of materials from a technical perspective basically correspond historically to the technical-empirical approach, where the best materials and professional teams were considered to be those that proposed "teacher-proof materials". The focus was on providing the best materials to help teachers in their teaching activity. The practical perspective is associated more with teachers' curricular decisions. The traits that characterize the logic and function of materials under a technical and rational perspective of curriculum innovation include the following (Area, 1999: 196-197): media design done by technical experts; media production is among the tasks involved in curricular design; materials present a closed structure with little flexibility and are designed for a standard type of student and cultural context; there is excessive confidence in media as the most effective strategy for enabling teachers to carry out instructional practices in line with innovative syllabi and teachers are expected to make a mechanical and faithful application of materials in the classroom.

The technical perspective provides the principal breeding ground for publishing houses and the obsession by members of the educational community for obtaining the "super media". Likewise, if we had to choose a standard bearer for this perspective, it would be the textbook. In sum, we could say that the technical perspective has been characterized by the following:

— The consideration of teachers and students as receptive and passive subjects of "knowledge"

— The "obsession" by schools and teachers for finding the "super media" to help develop the curriculum.

— A "disregard" for the opportunities offered by each student's context together with the teacher's work for making student learning meaningful.

— Waiting for publishers to bring the best textbooks to schools.

— A desire for free curricular materials in our schools.

We will now go on to analyze some of the main advantages of the practical perspective that largely supports the need for elaborating own materials. Certain ideas and action proposals, such as the following, are emphasized (Area, 1999: 198):

— The responsibility for producing media and materials does not rest only with technical parties distant from practice, but rather the teaching staff can be active agents who assume responsibilities over the media and materials they use.

— Territorially diversified materials should be elaborated and adapted to the characteristics of their users and contexts.

— A tendency towards using localized materials and integrating them into the curricular

— Developing strategies and mechanisms so that materials elaborated by teachers (either individually or in groups) can be disseminated and known by other teachers

— Encouraging and facilitating the exchange, distribution and elaboration of materials in schools and regions.

— Media and materials can become a pretext for reorganizing and reformulating school spaces and learning environments to promote greater collaboration.

We are aware that proposing a "break" in practice with the technical perspective represents a difficult task in light of current circumstances at schools. But we are also aware form the analysis of the literature and experiences that it is possible, necessary and feasible to apply a practical approach to this perspective (See Castro Rodríguez, Rodríguez Rodríguez, Zapico Barbeito 2013; Rodríguez Rodríguez, 2003, 2006). These considerations could foster professional development through materials and the design of materials that respond to "real problems" in our schools. However, it also requires development of strategies in schools, training centers and government administrations to provide teachers with the training and organizational-curricular conditions so they can cooperate, exchange projects, design materials, and become acquainted with other experiences. This could help transform the passive practices usually applied to resources (particularly textbooks) into active practices where materials are at the service of curricular proposals and not vice versa.

Parcerisa reflected on what it means when teachers elaborate and adapt their own resources:

"Teachers elaborating materials for students implies people that are inquisitive and concerned about the quality of teaching, where resources in general and curricular materials in particular play a prominent role" (Parcerisa, 1996: 60).

It should also be remembered that the recent literature on the subject highlights important deficits in resource characteristics (see for example: Gómez Mendoza, Braga García and Rodríguez Rodríguez, 2016) and describes significant gaps in how they are used. Teachers continue to base their decisions regarding materials on publisher consideration, which largely determine school curriculums (Gimeno, 2010). We are faced with teachers who act basically as curriculum consumers, and except for isolated and very laudable experiences, it is hard to find proposals where teachers elaborate their own resources and reflect on what the experience has meant for them professionally (See, for example, López Facal, 1996, Montero y Vez, 1992 and Martín Hernández, 1999). Similarly, much of the research underlines the need for teachers and the administration to adopt appropriate measures so that teachers constitute a working and learning community around the design and evaluation of their own resources.

TEACHERS, INNOVATION AND DEVELOPMENT OF OWN MATERIALS

For a teacher to carry out their educational activity with materials professionally, implies that they are reflective and critical about teaching practice and the materials used in the classroom. Teachers who do not reflect on their teaching practice and on the materials used in their classrooms accept, often uncritically, the daily reality of their schools and use predetermined materials that help structure and conduct their classes. Thus, the presence of publishers makes sense to them, as does the publishers' desire to produce the most attractive resource for their consumers (teachers) by helping to organize work in the classroom. The present situation could be described as curriculums produced by publishers and consumed by teachers. Teachers try to find the most effective and efficient media to achieve the goals proposed by the administration and developed by publishers, but often "disregard" the specific circumstances of each school, classroom and student. In this setting, a good many teachers decide to use an elaborated material, usually a textbook. The key issue is not whether teachers use one textbook or another; but that teachers use the textbook such that it becomes the very curriculum itself. By implementing its objectives and activities, the material can become practically the entire teaching activity. The teacher loses the notion that materials as well as every circumstance could represent an alternative and an "unrepeatable" opportunity for learning, reflecting and investigating. On the contrary, teacher seems to consider their practice with textbooks as something habitual, irreplaceable and reproducible in every circumstance.

The characteristics of resources and teacher activities should be consistent with a model of change and school renewal, which means that the "professional" who uses these materials faces a complex axiological and ideological reality and must ask "what", "how" , "when", and "for what purpose" to teach their students. In line with this, they shall develop a capacity for critical reflection that will enable them to deal with diverse situations and demands in a variety learning contexts.

Let us now look at some of the aspects that characterize the work of a professional teacher with curricular materials:

Considering curricular material as "one more" element of the curriculum, yet one of the most important: Every curricular material and socio-educational reality is "unique", "original" and "unrepeatable". We must resist the temptation to make generalized proposals for a range of contexts. In fact, the essence of a proposal lies precisely in its ability to be adapted to diverse settings and foster an understanding of how working with materials can constitute an opportunity for reflecting on one's own practice and making classroom teaching-learning processes more meaningful.

Specification of the pedagogical model: It is important for teachers to be aware of the model underlying their use of a material and of the pedagogical model underpinning the conception of each material. We believe, as Martinez Bonafé said (1998: 123), that "a curricular material is a theory about schools. It is not only a support or medium for instruction, but it is also a fundamental way of conceiving the implementation of the curriculum as well as the work of teachers and students."

The use of materials not strictly designed for schools. The appearance of institutions producing new educational materials (town councils, associations, museums, etc..), means that teachers who are aware of these proposals can use them to enrich their educational practice.

Delving deeper into the documents that articulate the use of materials: Curricular Designs, Curricular Frameworks, among others.

It is necessary for teachers to be aware of the documents that can condition the role of curricular materials in different countries. These are basic and essential resources for understanding the role of materials in the curriculum.

Autonomy in the management of the curricular materials used in their practice.

The role and function of curricular materials must be constantly reinterpreted and reconsidered. As individuals and groups, teachers require a certain degree of autonomy. As noted by Montero (1996): "Teachers' professional autonomy is one of the most representative aspects of their condition as professionals. By autono-

my, we mean the ability to control one's own decisions," such as those regarding curricular matters. This autonomy leads teachers to equip themselves with strategies for selecting and evaluating the materials that they intend to use. Through this autonomy, teacher must make appropriate use of media to facilitate access to information, organize information and ideas, develop values and attitudes, help shape expectations and facilitate models for action. Likewise, it is necessary to encourage teacher participation, either through work groups in their own school or through interdisciplinary work groups involving systematized lines of research on the subject of curricular materials.

Making curricular materials part of school dynamics.

Decisions regarding curricular materials should be "shared" in the context of the school, thus fostering the dialectic relationship between a teacher's own knowledge about curricular materials and the knowledge that may already exist in the school as an entity.

WHAT ARE THE IMPLICATIONS OF TEACHERS PRODUCING DIDACTIC MATERIALS?

As a hypothesis.

We part from the understanding that elaborating own materials is a hypothesis; a wide range of possibilities which teachers and the students can use to learn and experience about the nature of a subject and its conditioning factors. In professional terms, it is a proposal that allows experimentation instead of merely being "assimilated" or completed by the teacher. Our hypothesis regarding the elaboration of own materials is in line with what Contreras (1994: 37-38) pointed out in the sense that

> "it expresses action principles that make it possible to search for the strategy that best fits the specific circumstances in each case. These principles become the guide by which a teacher orients their performance. A principle does not indicate what to do exactly. It expresses instead the logic by which one should act, since it formulates basic ways of proceeding. Therefore, when determining performance, the teacher must decide how principles are transferred into the classroom. Inevitably, then, they become experimental. The teacher experiments with them when looking for a way to translate them into concrete actions".

Demystifying

Although we are aware of the difficulties involved in teachers elaborating their own materials, the truth is that the same typical fears associated with any attempt to innovate in schools are also associated to this activity. Of course, it is true that developing own materials properly takes time and training, that schools must be receptive to a proposal which goes somewhat against the usual decisions they

make, but it is no less true that any school innovation proposal involves struggle and difficulty and that any attempt at destabilization or "discomfort" in schools can cause malaise. Nevertheless we must remember the following:

> "the path by which we are called to go is steep and rugged. What of it? Can the heights be reached by a level path? But the way is not so sheer as some suppose. The first part only has rocks and cliffs, and appears impassable, just as many places, when viewed from afar, seem often to be an unbroken steep since the distance deceives the eye; then, as you draw nearer, these same places, which by a trick of the eyes had merged into one, open up gradually, and what seemed from a distance precipitous is now reduced to a gentle slope". (L.A. Seneca: Dialogues, "On the firmness of the wise man2] (6)

The deconstruction and reconstruction of our teaching practice.

The capacity of certain didactic materials, especially textbooks, to condition our teaching practice through aspects such as their socializing, political, and structuring potential means that we must pay special attention to analyzing the ways in which practices with materials may build and reconstruct our teaching practice. Therefore, a proposal for elaborating and adapting own materials implies an analysis of how this practice may represent a new way of constructing and reconstructing the curriculum.

Social networks and technological support for the didactic material elaboration processes.

In brief, we can say that new technologies and social networks may contribute the following:

— improving the quality of materials. They make it possible to use images and texts from different realities, make montages that were previously impossible, foster new types of presentation, and provide access to a variety of photographic and video resources that were once hard reach.

They make it easy to go online and find complementary materials. More and more teachers and teacher groups, companies, and associations offer teaching guides and material proposals.

— as a means of communicating among participants,and making it possible to exchange materials among schools. It should be borne in mind that the problem is sometimes not so much the existence of materials but the possibility of exchanging or using the materials that are available to teachers.

The potential provided by technologies means that it may be necessary to consider the possible metamorphosis of didactic material (Area, 2017), as well as important nuances with respect to digital didactic materials. As pointed out by Area (2017, 24):

Unlike traditional analogue teaching materials such as books, audio, image or audio-visual media where information was packaged in tangible objects favoring receptive teaching-learning models, new didactic materials emerge as an open and virtual setting where teachers and students have the potential to articulate projects and school experiences based on active learning pedagogies.

THE EVALUATION OF MATERIALS ELABORATION AND ADAPTATION PROCESSES

Analyzing and evaluating materials, like any other teaching activity, requires awareness of its importance and learning how to do it. Evaluation should cover as many aspects and realities as possible, as long as the abundance of factors does not make the process overly complicated. The need to evaluate own materials has led to the development of a variety of models and guides that provide information regarding the diverse aspects involved in evaluation. A review of these aspects and their contributions to the evaluation of teachers' own materials reveals a broad diversity of approaches; some models and guides are more open and general, allowing for an overall assessment and evaluating the function of curricular materials from a globalizing perspective contextualized within the curriculum (for a deeper understanding of the characteristics and peculiarities of different evaluation guides see Rodríguez Rodríguez, 2001; Reints and Wilkens, 2010; Cepeda Romero, Gallardo Fernández, Rodríguez Rodríguez, J., 2017).

The following is a brief summary of the characteristics of materials elaborated by teachers themselves in Rodríguez Rodríguez (2011):

Curricular materials, whether produced by publishers or teachers, must meet certain requirements:

- Include alternatives for dealing with diversity and multiple educational contexts. Content should be as varied as possible, and offer options to suit different needs, so that teachers are not limited to one source of information. Special attention should be given to cross-sectional issues.

- Resources should be diversified so that teachers can draw on a variety of information sources.

- Allow for analysis and reflection.

- Varied content in terms of concepts, procedures and attitudes.

- Sufficiently versatile – able to be adapted by teachers to fit their planning and programming needs. Should also reflect differences in students and their abilities.

- As far as possible, materials should be pre-tested. They should be accompanied by explanations/suggestions to help teachers interpret and adapt the content.

- They should be in line with the school's educational and curricular project.

- Should be factual and scientifically rigorous, and free of conceptual and methodological errors. They should not contain technical mistakes and should include meaningful, well-selected examples, as well as updated bibliography and information that is well-organised.

- Should facilitate incorporation of other materials into the didactic process.

- Although good materials can be produced by a single author, it is advisable they be designed by multi-disciplinary work groups.

- They should appropriately address issues such as sexism, racism, and individualism.

- Should foster the professional development of teachers and encourage their professional autonomy.

- Should be mindful of formal aspects having to do with design, typography and overall appearance.

- Should address the global and interdisciplinary nature of the curriculum.

- Should be flexible enough to allow inclusion of other materials into the didactic process.

CONCLUSION

Properly understanding the process of elaborating and adapting didactic materials implies a curricular perspective that allows "understanding" and "analyzing" materials in their context of use and in the midst of their particular problems, resistances, authors and users.

The elaboration and adaptation of materials is a great opportunity not only to think about the processes of design and evaluation, but also to reflect on the role of these elements in the curriculum. It is also an opportunity to consider the main obstacles to school innovation.

We can hardly consider processes of design and evaluation of materials without adequate training to facilitate professional decisions-making on the matter.

It is currently fundamental to consider the process of elaborating and adapting own materials in conjunction with the possibilities provided by new technologies.

Finally, designing and evaluating own resources means dealing with "resistance" that hinders the process. The inertia of textbooks, the lack of financial and administrative support, and the lack of time for teachers to carry out these tasks are clear examples of resistance that must be overcome.

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COLLABORATIVE TEXTBOOK PRODUCTION. CONTRIBUTIONS FROM THE RECREATING STORIES PROJECT (1997-2017)

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INTRODUCTION

This paper intends to highlight the possibilities created by a university outreach project based on the understanding that knowledge production is the axis where the main purposes of university activities intersect. The Brazilian Constitution defines that the university has three functions which must be carried out inseparably: teaching, research and outreach. Therefore, activities in the university should be based on the principle of articulating these functions, which has for different reasons proved to be a challenge.

Despite the debates in the specific case of outreach activities, it is often understood that the university is responsible for giving the knowledge produced in research activities back to the community. According to this point of view, the dissemination of results could be done through courses, advisory services, projects and programs coordinated by university professors.

This concept of outreach project was questioned by Paulo Freire (1977/2002), due to the fact that the objective of the activities is often the replacement of a previous knowledge – less scientific, based on common knowledge and with little value – by another knowledge generated through scientific research. For this reason, this scientific knowledge would present a greater potential to contribute to the social development of certain specific groups or populations.

In agreement with Freire, we consider that the production of knowledge should not be restricted to the university, although it is inherent to this institution. This idea was employed when proposing the Recreating Stories Project, which was developed in the metropolitan area of Curitiba (state of Paraná, in southern Brazil), based on technical cooperation agreements between the Federal University of Paraná and local City Halls, in particular the Education Secretariats. The motivation to carry out the project was the need to discuss and propose alternatives for teaching history in the initial school grades, with an emphasis on local history, as this theme or approach is recommended in the national curricular guidelines and in the regional and local orientations (Brazil 1997).

The development of the project with students and teachers of the fourth grade of elementary school (9 year olds) resulted in the elaboration of a textbook entitled "Recreating Stories" for use in the schools of the municipality. The book includes

documents collected by the schools in the area, as well as activities produced from these documents during the classes, planned and executed by the participating teachers and students.

The training activities for teachers were coordinated by the university together with the local educational system. University professors, undergraduate students of different courses, teachers and fourth grade students from municipal schools, other school professionals and technicians from the education departments all worked together in the project, as well as researchers and other support professionals from different fields of knowledge.

The concept guiding the project is the idea that the teacher's work, at any degree of teaching, includes necessarily their approximation with the means of knowledge production – and therefore with research – in each specific field of knowledge. This constituted a structuring principle of the continuing formation activities proposed and developed here. The references that support these positions are presented in the first section of the text.

As a result of this concept, the project was developed through collaborative actions, which are briefly described in the second part of the text. At the end, in the third session, we present the results of the textbook production activities developed by teachers and students, highlighting principles which contribute to practices of teachers' continuing education, articulating outreach projects, teaching and research.

TEACHERS' EDUCATION, KNOWLEDGE PRODUCTION AND DIDACTIC MATERIALS

Although not a recent issue, the concern regarding teachers' education has only been reinforced as a specific field of research in the last few decades. The discussion about teaching as a profession, within the context of broader debates on labor relationships in the contemporary world, presents elements for the debate about the meanings and nature of teaching, as well as about the ways teachers' education must and can be performed.

The idea that the teacher should be a researcher is not new either. In the beginning of the 20th century, the importance of a scientific approach to educational problems and teacher participation was advocated by thinkers such as Dewey, largely associated with the North-American discussions on action research (Marcelo García 1995).

During the decline of the action research movement in England in the 1970s, Lawrence Stenhouse and John Elliott, both connected to CARE (Center for Applied Research in Education), emphasized the understanding of the teacher as a political and social actor, as a researcher, in the sense of an autonomous professional with possibilities for self-development within the curricular work (Sten-

house 1998). According to this idea, teachers are seen as partners in the evaluation of research results produced by academics, as well as collaborating with the planning of investigations, data collection and analysis in their classrooms.

In the 1980s, the power of action research was renewed building on the production of authors such as Schön and Zeichner, who convert the teachers into the researcher of their own practices through the idea of reflection in action. This concept acknowledges that teachers should play active roles in formulating the purposes and goals of their work, as well as leading educational reforms. The theory affirms that the production of new knowledge regarding teaching and learning is not exclusive property of schools, universities or research and development centers, and that teachers can contribute to producing knowledge about best teaching practices (Zeichner 2002, 34).

We highlight the importance of instruments such as scientific journals, portfolios, case studies and action research to enable the realization of these possibilities. Action research, especially, occupies a very large space in educational research in Brazil, an influence extended throughout the entire 1990s, particularly through the idea of a reflective teacher derived from the works of Shön and Zeichner.

Other perspectives were added to the debates of the 1990s, particularly in the direction of "teacher research" with reference to the works of Cochran-Smith and Lytle (1993). From their point of view, the research conducted by teachers about their practices is defined as a "systematic and intentional research about teaching, learning and the school", an activity which requires specific ways of obtaining, documenting and recording information, as a consequence of a planned action. This is an advancement regarding teachers' effective participation in research processes.

These perspectives were the reference point for activities developed in two research centers of the Federal University of Paraná – the Center for Research on Didactic Publications (NPPD) and the Laboratory for Research in Historical Education (LAPEDUH). According to their conceptions, teachers are considered producers of teaching-related knowledge based on some work principles:

a) Collaboration between the university and other institutions or groups, such as schools and other educational systems.

b) The actions performed by teachers to plan and develop their activities as having a central role in improving teaching.

c) The existence of common projects, elaborated collaboratively in which the aims are connected to the interests of the different collaborating subjects.

Researchers linked to these groups understand that, given some objective conditions for the development of continuing education activities, it is possible for

elementary school teachers to include and perform the production of knowledge as an activity inherent to the teaching function.

Therefore, it is important to elaborate and develop proposals to overcome the hegemonic models which pull teachers apart from the processes of knowledge production, and to provide them with the possibility of being educated in activities of a collaborative nature which demand new forms of action regarding the teaching contents (Garcia & Schmidt 2017).

On the other hand, studies carried out within these research groups (for example, Chaves 2015, Borowicc 2016, Moraes & Garcia 2016, Vieira 2018) have demonstrated that the textbook is a widely used resource in class, in agreement with statements by authors such as Choppin (2004) and Escolano Benito (2006). Thus, despite social transformations in the contemporary world, the textbook continues to be a material that affects teaching conditions (Martínez-Valcárcel, Valls & Pineda 2009) and is present in school life (Garcia 2014).

However, studies also show that teachers use textbooks in very different ways, sometimes only occasionally and in specific situations (Teixeira 2009). They choose instead to produce didactic materials of different types and with different objectives, which they consider to be more appropriate to their needs. It is, therefore, an activity inherent to teaching, which happens with different intensities and with different perspectives, and which is an object of interest in schools.

In this perspective, the production of materials by teachers is a potentially stimulating and challenging activity which requires knowledge regarding teaching contents and procedures, as well as about learning processes and their objectives, among others. In addition, the production of teaching materials demands epistemological and methodological analyses, cut-backs and choices. For these reasons, it can be understood as an organizing axis of the formative processes.

A COLLABORATIVE SPACE BETWEEN THE UNIVERSITY AND THE SCHOOL: FORMATIVE ACTIONS BASED ON RESEARCH

In 1997, the Ministry of Education performed a national curricular reform and the guidelines for working with contents of different subjects were elaborated and presented in a document called National Curricular Parameters, which also proposed specific history contents for all elementary school grades. The document presents local history as one of the theme axes for initial grades, having the objective of contributing to the construction of the student's notion of belonging to a particular social and cultural group by studying "different ways of living in the present and other times, which exist or have existed in the same space" (Brazil 1997, 52).

The document also highlights the studies of the community environment as a "privileged pedagogical resource (...) that enables students to progressively ac-

quire an inquisitive view about the world they are part of." (Brazil 1997, 91). Therefore, the guidelines produced to direct the curricular proposals in Brazilian schools pointed to local history as a teaching content and didactic resource or, in other words, as the means and the end for teaching history to initial grades.

Another element to be highlighted is the consensus present in the scientific field and incorporated into the official guidelines about the importance and necessity of using sources as well as varied means (music, comics, images, among others) to teach history in elementary school since the initial grades.

In this context, teachers from some municipal schools systems have shown difficulties in teaching history at this school level. In the Brazilian case, such difficulties occur, on the one hand, because teachers who work in the initial grades do not have specific training in history; on the other hand, they result from the gaps present in teaching materials produced based on local references.

It is important to highlight that there is a textbook distribution program for public schools in Brazil, called the National Textbook Program (PNLD), created in 1985 and maintained until 2017 with changes and adjustments over time. In this program, one of the central elements is the evaluation process to approve the books which can later be selected for use by the teachers.

Thus, the Brazilian textbooks are marked today by certain ways of understanding teaching and learning which largely correspond to the convictions, theoretical and methodological choices of the specialist groups who elaborate the evaluation criteria within the PNLD. The books are also affected by the compulsory presence of certain themes or approaches, as well as an editorial model of graphic and aesthetic design which authorizes or not the presence of elements of visual language and text formatting.

These definitions create clashes and contradictions. On the one hand, it can be said that the textbooks distributed to public schools show positive transformations resulting from the evaluation processes. Some of the criteria have been consolidated in all school subjects since 1997 – for example, books presenting manifestations of prejudice or conceptual mistakes are not approved, as well as those which do not present a corresponding relationship between the methodological proposal presented by the author in the teacher's handbook and the final volume produced for the student.

On the other hand, the set of criteria ends up imposing limitations on textbook creation and production, be it from a didactical and methodological point of view or from the editorial project perspective. The small margin for innovation and the mandatory requirements have contributed to a high degree of homogenization within textbooks, with different elements in the various school subjects.

In this sense, it can be understood that the elaboration of books for students use is consolidated in Brazilian school culture, regardless of particularities and specificities, at least in regard to the textbooks destined to public schools. At the same time, some criteria stimulated authors to produce didactic-methodological strategies which allow the approach of the so-called local contexts or realities – following the national curricular guidelines.

Analyzing this issue, Garcia (2011, 40) points out that "the first way in which the National Program sought to address the issue of local contexts was the inclusion of books with specific content – in this case, history and geography – in the listings for selection by schools and teachers". Although there are no specific textbooks for all Brazilian states, most of them have this option in their school subjects.

There is a second possibility for responding to local contexts which is also present in textbooks of different contents and grades. This option concerns the didactic way to structure activities as proposed by the book's author. According to Garcia, in this case, "the demand for attention to local realities is shown in activities which lead students to research, interviews and comparisons, bringing elements of their locality; and it is also present in the teacher's handbook which accompanies the textbook, suggesting, for example, activities to complement the activities of the student textbook" (2011, 40).

Despite the existence of official guidance to lead books to approach local realities, there is a limit to it, due to the fact that authors and publishers elaborate book proposals which can be used by any school in the country. Furthermore, the textbooks should also approach the general knowledge suggested in the national curricular guidelines, which also guide the books evaluation and approval within the National Program.

Based on these issues related to local contexts, the two research centers (NPPD and LAPEDUH) were asked to develop courses and advise teachers on how to produce materials specific for each locality. This was the initial motivation to propose a project which established a partnership between the Federal University of Paraná and some municipalities located in the Metropolitan Region of Curitiba[1], so as to meet this need in the teachers' continuing education programs organized and maintained by the Municipal Education Secretariats – in this case for history teaching in particular.

In this perspective, the activities of the Recreating Stories Project began in 1997 and aimed at elaborating textbooks by teachers and their students in order

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[1] The projects were developed in the municipalities of Pinhais, Campina Grande do Sul, Rio Branco do Sul, Araucária and São José dos Pinhais (2000, 2003, 2008, 2012).

to supply the absence of local history materials, while also expanding teachers' knowledge about history teaching, its purposes and procedures.

The work was organized through university and school meetings, with the purpose of retrieving and documenting elements from the municipality inhabitants' memories and history. A process of "capture of contents" to be taught was organized based on curriculum themes, founded upon a set of activities aimed at collecting data and information about the municipality history, a process which involved both the school and the wider communities.

These investigative activities are a means to locate and identify documental sources kept in "family archive" (Artières 1998), while contributing to sensitize the community to contribute to this task, allowing schools to access personal documents, memories and stories. The set of identified and produced sources can then be didactically employed for use in history classes.

The curricular content is not replaced by the local history contents when organizing the teaching activities with documents collected from the family archives. The contents based on the sources and materials produced by the students acquire a new meaning, as they connect references to the individual and collective experiences of students and teachers and to the cultural dimension of that community. The systematic experience with the development of such projects and the process of theoretical reflection on their results enabled the pinpointing of guiding elements for the work with historical knowledge in the initial school years.

A first element is related to the fact that when the students search for documents, interview local residents or walk the streets seeking for the oldest houses, they understand that history is not restricted to the knowledge conveyed mainly by school textbooks, which is an instrument that has traditionally presented a historical knowledge without subject. They understand that history contents can be found everywhere, and that historical knowledge is found in human experience.

In addition, students and teachers can identify the evidence (contents) of human experience in different ways: a) in everyday reality (looking at the nature, landscape, architecture); b) in traditions (parties, leisure activities); c) in memory (testimonials); d) and also in systematized historical knowledge. And they understand that human experience, in this indicial perspective, not only has a local dimension (neighborhood, city), but is also identified with and connected to the experiences of other people, from other times.

THE PROJECT AND ITS RESULTS: THE PRODUCTION OF TEXTBOOKS BY TEACHERS AND STUDENTS

As presented thus far, the project was structured through formative study activities and the organization of didactic activities to teach history, involving the

teachers of the initial grades of elementary school, who are not specialists in this field. These activities were performed as part of the teachers' continuing education for an average of three years, and included the following steps:

a) Preparatory activities: meeting with teachers and structuring the project together.

b) Selection of the themes to be developed according to the Municipality Curricular Proposal.

c) Production of didactic activities of an investigative nature by teachers, in order to capture content through the collection, by students, of documents and objects kept in family archives and the school community.

d) Development of activities in history classes, exploring the documents and objects brought by students and teachers.

Presentations of teaching activities about the selected topics were performed in each school during regular meetings between the teachers, the Municipal Education Secretariat team and the university team. These aimed at the theoretical and methodological discussion of the results, as well as the students' learning process and planning next steps.

Throughout the project, the teams gradually worked on structuring the textbook with the support of professionals in the field of editorial production. This is the final objective of the project: to meet the need for a material featuring specific elements of the locality. Its production is based on the documents collected by the school community, enabling the generation of local history knowledge which is also connected with the experiences of other people and other eras.

The book incorporates results from the students' and teachers' production (drawings, written narratives, reports, graphs, among others). They resulted from the work conducted in the classroom, through the analyses of iconographic and written documents, discussion and comparison of collected testimonials, and the quest to connect previous knowledge with the information and data collected. In this process, students and teachers collectively construct knowledge about the history of their locality.

The co-authorship in this book triggered changes in the students' and teachers' understanding of what teaching and learning history is. Therefore, the process can be understood in the perspective of teaching innovation. Furthermore, the structure of the project and its activities created the conditions for the development of teachers regarding the didactic work with sources, bringing them closer to the process of knowledge production in the field of history.

More than learning new ways to work, teachers were subjects who actively participated in the construction and improvement of a methodology for working

didactically in the first grades of elementary school, based on the documents and objects kept as family archive. Although the collaborative process was limited to certain aspects, it contributed to overcome, through particular experiences, the dichotomy between those who produce knowledge regarding teaching (in universities) and those who only use or apply such knowledge to teach (in schools).

The books produced in this process show, in their content, the presence of schools, teachers and students, as well communities, as subjects who produce history. There are testimonials of residents and documents kept in the homes of ordinary people which help understand the life of that location in its relationship with other places and with other times.

The work performed in the classrooms, based on the work with the sources, is also registered in the textbook, describing processes and showing results. In addition to documenting elements of local history and culture, books can serve as a reference to the work of other teachers who, based on the contents and procedures presented, can recreate them with other students, at other times, producing new perspectives about the city and their subjects.

FINAL CONSIDERATIONS

The perspective taken on the collaborative process between the university and the educational systems aimed at bringing the elementary school teachers closer to the educational research. It allowed the systematization of some principles that underpinned the actions of the project, based on the activities performed and the analysis of the obtained results. These principles can serve as a reference to other similar processes of didactic material production associated with local culture and history.

The first principle, of didactic nature, is related to the understanding that cultural contents should constitute the basis for teaching. Different authors have worked based on this idea, although with different understandings of what this means for the activities performed in the classroom. Throughout the project development, Freire's contributions (1967, 1970) were used to claim that the contents of pedagogical processes in teaching and learning must hinge on the identification of the diversities and inequalities that compose social reality, both in local and broader contexts, and which are expressed and understood in different ways by the subjects.

For Pérez-Gómez (1998, 92), learning can be considered a process performed by the student in terms of reconstructing the culture and public knowledge of the social community. According to the author, culture is understood as a set of meanings and shared behaviors that are found "in institutions, customs, objects as well as in ways of life, and in the mental representations elaborated by individuals and groups", manifested and transmitted in different ways and in an unequal manner.

Thus, the main didactic challenge for this author is to contextualize the learning tasks within the community culture, where the contents to be learned acquire meaning in everyday life through the students' active participation in defining these contents and the teaching and evaluation processes.

The second principle derives from a reference in the field of historiography and is related to understanding history teaching as the study of human experience in time, based on Thompson's (1981) perspective. This perspective enables teaching contents to be given a thematic treatment and, thus, contribute to the formation of individual and collective identities, aiming at recovering the meaning of personal and collective experiences which relate to the themes to be taught and learned.

Still from the point of view of the science referenced in this specific case – history – some methodological aspects were considered relevant for the project development. The first one concerns the idea of local history. According to Ossana (1994), the work with local history in teaching can be an adequate instrument for the construction of a more plural, less homogeneous history which would not silence specificities. The work with local history in history teaching used as a pedagogical strategy indicates some possibilities, such as the discovery of heritage, statuary, local press, toponymical and local archives.

In addition, the possibility of using documents kept in family archive (Germinari 2001, 18) for teaching was a defining element. Such documents "are not part of the lives of people who have had some public prominence on the political scene, or have done something 'important' for society (...) they can be found inside the most diverse residences, stored in drawers, in cardboard boxes, temporarily forgotten on top of cabinets". The documents and objects stored by people in their homes can be a starting point for structuring teaching activities and for the production of textbooks by teachers and students.

Finally, one last element to be highlighted – which also constitutes a principle – is related to the nature of the relationships between universities and elementary schools. The choices made in the Recreating Stories Project assumed that the desired transformations in history teaching – especially regarding the conception which seeks to recover the meaning of personal and collective experiences – will not be brought about by curricular reforms in the models proposed so far and which remain hegemonic today. The project, in its materialization, has indicated interesting ways to think about teachers' participation in the processes of debate and production of knowledge about teaching, in regard to both themes and contents to be taught, as well as the ways of structuring activities for the work in the classroom.

The evaluation of the experience carried out for almost two decades showed that collaborative proposals between the university and the teaching systems am-

plifies the results of the actions and create alternatives for outreach activities as a space of knowledge production by the different subjects involved.

It has also allowed us to verify that the presuppositions, defined strategies and procedures produced a qualitative change regarding historical knowledge: by experiencing elements of the specific research method in history, as part of their continuing education process, teachers learned to find the content in different forms of history, as well as to work with these contents in their classrooms.

The research regarding teaching can and should be an activity inherent to the work of teachers when considered in connection with the research method of the sciences of reference. Working with the specific research methodology of an area of knowledge – and not with the generically understood research – enabled teachers to live and understand a certain conception of history and stay focused on the path that shows the historic knowledge production process.

From the perspective of conceptions about teachers' work and training, it was possible to bring the teacher closer to the way knowledge is produced, allowing the appropriation and construction of teaching and learning ways. New ways to relate to knowledge were also established: the procedures for identifying, selecting and proposing teaching contents, in the case of history, could also be developed by the teachers themselves, based on their involvement with their historical reality, a basic presupposition for producing historical knowledge.

It should be emphasized, however, that new knowledge is not directly transposed into the repertoire which teachers must use and coordinate when preparing and developing their history lessons on a daily basis. Here we can recall the elaborations of Escolano Benito about the relationships among the institutional political culture, the scientific culture and the empirical-practical culture which constitute school culture and which help explain the distances between the norms and official proposals, the academic production and what is done in daily school life.

The understanding of these processes of knowledge appropriation, which imply adaptations, interpretations, acceptances and refusals, indicates the difficulties in changing practices when teachers are not the subjects of the production of knowledge about teaching. In many cases, the books and other materials produced in the Project have been incorporated to the set of other materials already available at the school and which are not structured based on the same theoretical-methodological references. Although teachers recognized the importance of using documents in history teaching and were aware of the ways they can be used, this did not mean incorporating such strategies into all history classes.

These findings reaffirm the relevance of teachers' continuing education processes and emphasize the understanding that the production of textbooks and other didactic materials may be the underlying activity of these processes. It enables the

construction of knowledge about the teaching purposes of the different disciplines, the selection of content and themes, the definition of strategies and procedures adequate to the intended objectives and, especially, the understanding of how to produce knowledge in the sciences of reference.

In the case of research, teaching and outreach activities, the project also re-affirmed the relevance of capturing the teaching contents in social experience, in culture and in the history of the communities around the school, so that the relationships may be enlarged and become more complex based on these contents.

Finally, it is important to highlight the role that the university can fulfill in outreach activities proposals, whose objective is to enable teachers to actually appropriate of the knowledge necessary to perform their functions in teaching.

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PART 3

TAKING INTO ACCOUNT CONTEMPORARY CHALLENGES BY FOCUSING ON RESEARCH

A. THEORY AND METHODOLOGY

TEXTBOOK ANALYSIS AND THE NEED TO COMBINE APPROACHES

BENTE AAMOTSBAKKEN

INTRODUCTION

Although multimodality is often discussed as a modern phenomenon, it would not be right to claim that multimodality is characteristic only of recent textbooks and other educational media. Textbooks from earlier decades are in fact also multimodal, as illustrations of different kinds are integrated with verbal text in order to promote learning. In this article, I use the concept of multimodality and multimodal analysis combined with text linguistics to argue that these approaches to educational materials such as textbooks allow us to better uncover the total amount of elements found in textbooks. In order to do this, I closely examine two figures from Hæreid & Amundsen: "Vi ere en nasjon" - Norges- og verdenshistorie (1950) (Figure 1) and Jerstad, Sletbak & Grimenes: Rom Stoff Tid. 3 FY. Grunnbok (2003) (Figure 2).
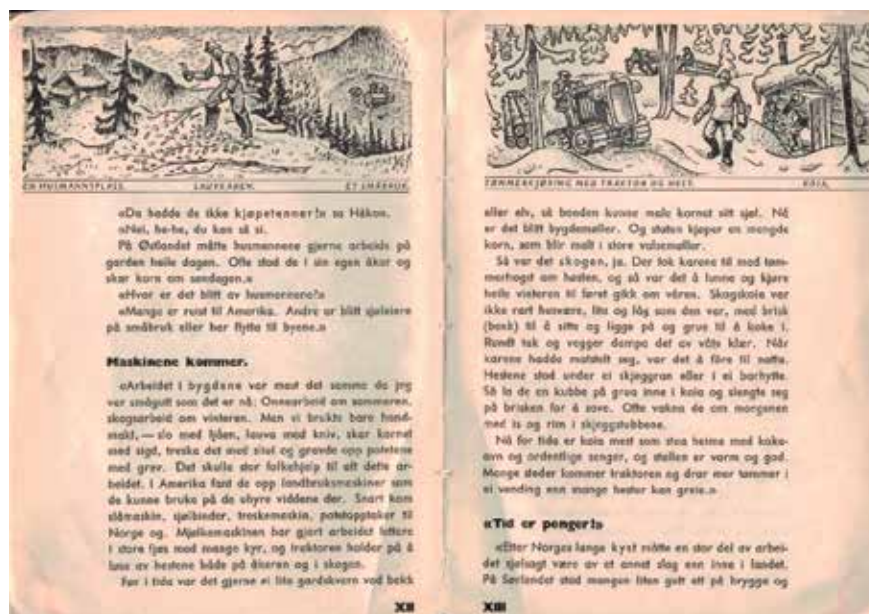

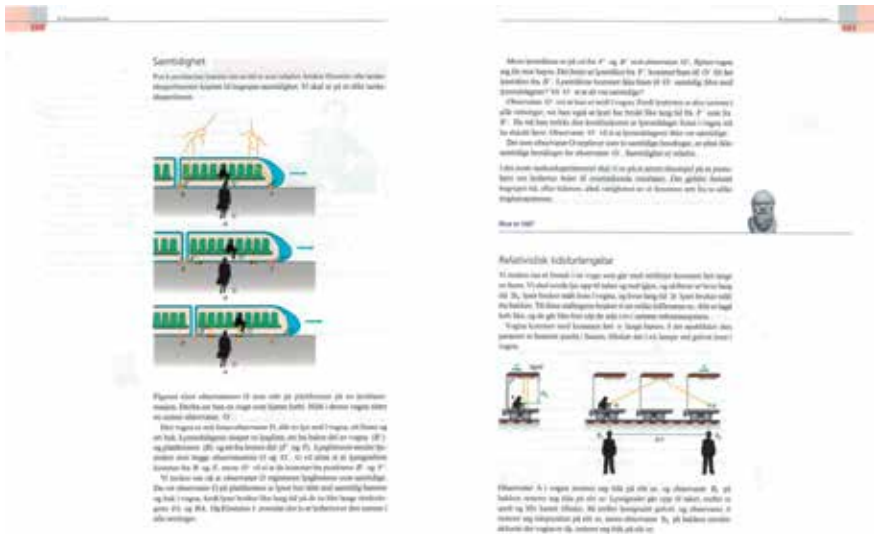Figure 1 "Vi ere en nasjon" - Norges- og verdenshistorie (1950)

Figure 2 Jerstad, Sletbak & Grimenes: Rom Stof Tid. 3 FY. Grunnbok (2003)

Figure 1, taken from an old history textbook, contains two different narrative representations when read through the lens of Gunther Kress' and Theo van Leeuwen's work. The body-text conveys to the students how people in the countryside had to struggle for a living in the past while the images show activities typical for crofters or tenant farmers in Norway, such as logging and forestry. In Figure 1 the two pictorial narratives are interconnected through their rural setting i.e. the two illustrations form an entity that becomes fully integrated with the content of the body-text. The drawings placed above the verbal texts on the page both visually represent and emphasise the verbal content. In my view, the composition of the double-page spread is particularly interesting as the illustrations have very short captions that simply name the activities seen in the drawings. The students therefore have to make the necessary connections between the illustrations and the content of the body-text, and thus an aspect of salience, as described by Kress & van Leeuwen, comes into play. The information value of the elements is different on these two pages, and the degree of salience is debatable. Both the illustrations are placed at the top of the pages and are therefore highly salient. However, the verbal text covers two-thirds of the pages, far more than the illustrations. Kress and van Leeuwen explain this kind of relationship:

> When composition is the integration code, salience is judged on the basis of visual clues. The viewers of spatial compositions are intuitively able to judge the 'weight' of the various elements of a composition, and the greater the weight of an element, the greater its salience. This salience, again, is not objectively measureable, but results

from complex interaction, a complex trading-off relationship between a number of factors, size, sharpness of focus, tonal contrast […] placement in the visual field (elements not only become 'heavier' as they are moved towards the top, but also appear 'heavier' the further they are moved towards the left, due to an asymmetry in the visual field) […] (Kress & van Leeuwen, 1996, s. 212)

Figure 1 is spatial as the illustrations have some elements to the front and others in the back of the picture. The rural scene depicting a crofter has a certain depth since it is the crofter chopping branches of a tree that catches the eye. The other part of the illustration depicts how more modern lumbering activities were carried out. In this part, a tractor is used and in the background we can see a horse transporting logs. At the front of the illustration we see a carpenter's lodge: this is a shed where the carpenters could sleep during the night. The composition of Figure 1 demands interaction on the part of the reader who has to move between the visual representation with its elements of salience and the narrative represented in the verbal text.

This example illustrates how multimodal perspectives helps us read the entire double-page spread (Figure 1). The example furthermore opens up a broader discussion of the concept of multimodality itself and its fruitful combination with text linguistics.

COMBINING MULTIMODAL AND TEXT LINGUISTIC APPROACHES

The example in Figure 1 is from a history textbook published in 1950, and it confirms that texts very rarely consist of solely verbal representations. In other words, texts are almost always multimodal in their character. The need to analyse multimodal texts as single entities has become evident during the last few decades. To put it differently, the concept of "text" has been extended to include elements and/or expressions which make meaning by way of various semiotic resources such as speech, writing, pictures, colours, sounds, etc. The concept of "text" consequently implies the interplay between various semiotic modalities. However, "text" is not parallel to the concept of modality, since this concept is restricted to the constitution of an element in a multimodal text (a term which signifies a system of semiotic resources organized to create meaning). The pictorial modality thus constitutes a different pattern of meaning than verbal language. The meaning-making created by combinations of visual and verbal texts is nothing particularly new: newspapers, textbooks and illustrated books for children have been characterized by this combination for centuries, and in fact, much before that if we consider Roman tombstones, medieval manuscripts, stained glass windows etc. They all combine text and image. However, the potential to combine texts of various modalities has increased radically with digital technology. The possibility of selecting various modalities and combining them into a digital file on a computer is now accessible for a large number of people across the world. According to

Gunther Kress and Carey Jewitt, this has led to an extended freedom of choice in modern societies, since we can now convey a message by sending images instead of representing that message in words (Kress & Jewitt, 2003). "Showing" has taken over for "telling".

Digital texts are highly multimodal, but traditional textbooks today are also characterized by their extended use of multimodal resources. Different semiotic modalities are able to solve different tasks in the mediation of content. The concept of affordance is frequently used to describe the possibilities and limitations of a semiotic modality's capability to express meaning. The concept of affordance has its origin in the field of psychology (Gibson, 1977). In the study of texts, affordance is useful to study the forms and conventions of expressions. For instance, the affordance of an image like the one showing the crofter at work in the forest is material and makes us recognize the environment instantly. But at the same time, we make use of cultural affordance to read pictures. The limitations embedded in the pictorial modality are in this case related to the fact that the picture is a drawing without any focus on the details of farmhouses and other artefacts in the environment. This means that a detailed photo would have had a potentially stronger affordance than the drawing in question.

According to Kress and van Leeuwen, meaning-making is rooted in our culture (Kress & Van Leeuwen, 2006). Consequently, the semiotic modalities' potential for meaning-making—their affordance—is dependent on their cultural context. Students today are familiar with a pictorial and multimodal culture characterized by the interplay between various modalities and frequent shifts of expressions. Consequently, the need to develop solid text competency is even more important than earlier, as it is necessary to understand the affordances embedded in various modalities. Only then will the students be able to choose the most efficient ways to communicate and produce texts.

Being aware of the affordances of various modalities is also important for us to thoroughly analyse the linguistic levels and complete structural principles of a text. The principles of text linguistics are suitable to combine with an analysis of the multimodal features of a text. Whereas text linguistics gives us tools to uncover the layers of a text from the single word or sign up to the level of the complete structural text, the elements exterior to the verbal text can be accounted for by the concept of multimodality. The combination of the two approaches gives us the potential to describe and analyse the total number of expressions within a certain frame. The introductory example from the history textbook reveals a rather simple combination of modalities, whereas contemporary textbooks in almost any subject often deliver a more multifaceted message. In this context, I want to focus on science textbooks. Pages and websites used to teach these subjects are characterized by numerous modalities such as graphs, columns, diagrams, formulas, photos, etc., in addition to the verbal texts which are often placed on the pages

with the aim to explain the accompanying content. According to Tuija Virtanen, texts can be categorized by way of a two-level typology (Virtanen, 1992). In the article "Issues of text typology. Narrative – a 'basic' type of text?", she discusses text-external as well as text-internal criteria and the combination of these in order to characterize and categorize texts. Her approach could easily be applied to textbook analysis. In the case of the double-page spreads (Figure 1 and 2), her combination of the concept of text types (Werlich, 1976) and Halliday and Hasan's concept of register (Halliday & Hasan, 1985) is useful. These concepts have much in common with the concept of genre and, according to Ruquia Hasan, genres encompass both registers and text types (Hasan, 1978).

It is always useful to decide what the dominant text type is in an analysis of a verbal text in a textbook (J. L. Kinneavy, 1980; J. L. Kinneavy, Cope, J.Q., Campbell, J.W., 1976; Longacre, 1982; Werlich, 1976). In the example represented by Figure 1, the body-text is characterized by narration as the dominant text type, with additional elements of argumentation and description. Being aware of the text typology dominant in educational texts is important since the structures of the texts are organized differently depending on the dominance of a certain text type. Narration is organized temporally whereas description is organized spatially, and the differences in textual patterns are decisive for the reading and interpretation of a given text. The study of text typology is concerned with what Virtanen refers to as text-internal criteria. These criteria "are connected with the form or content of texts", she argues, and she adds that "Several text or discourse typologies contain labels such as the 'descriptive, 'narrative', argumentative', 'evaluative', 'expository', 'instructive', 'procedural' type of text or discourse" (Virtanen, 1992, s. 294f.). Virtanen furthermore stresses that such text-internal criteria often refer to a more abstract level of classification than text-external labels such as register and genre. However, text types inherent in a text have implications for the category of genre as the genre of a text mediates to the student how to read and understand the text and its message. In other words, text-internal criteria such as text types and the connection between sentences and paragraphs are linked to text-external categories such as genre. In text-linguistic analysis, the three levels of a text (the micro-, macro- and the superstructural levels) are studied to catch all nuances and meaning-making signs within a textual frame. Whereas the superstructure is regarded in most cases as equivalent to genre, the connection between the two should be obvious. The minor and detailed level of the text is the basis for the major and external text level. Everything "connects to everything", so to speak. All levels have to be studied in order to uncover the text's potential as a learning resource.

A textbook's verbal text has a communicative intention and a final goal of creating learning for the students and increasing their competency. In this context, it is useful to quote the classic definition of genre by Swales:

> Genre is a recognizable communicative event characterized by a set of communicative purpose(s) identified and mutually understood by the members of the professional or academic community in which it regularly occurs. (Swales, 1990)

Genre and text types in an educational setting are inevitable and indispensable concepts when we approach texts with the intention of uncovering textual patterns and structural principles. Gunther Kress regards genre as a link between the social and the semiotic: it points to social organization and provides semiotic arrangements which realize these: hence my comment that genre provides 'means for contextualizing/locating/situating'. (Kress, 2010, p. 116)

Furthermore, it is useful to analyse verbal texts in textbooks or on the web to discover the relations between the body-text and its inherent text type(s), its different levels (from the micro-, to the macro- and the genre level) and the content represented in the accompanying illustrations. Whatever the subject being taught, textbook illustrations, whether they are photos, drawings, graphs, columns, diagrams or other types of images, should be carefully and consciously selected while keeping in mind how they will function together with the body-text. Illustrations are also "texts" and should thus be supportive means for the students' comprehension and interpretation. In the case of the old history textbook (Figure 1), the connection is clear. The textual narrative in the body-text is emphasised by the illustrations, which aid the students' visual imaginations. In other educational subjects, the connection between text and image might be more obscure.

THE NEED FOR BOTH MULTIMODAL AND TEXT LINGUISTIC COMPETENCIES

Gunther Kress suggests there has been a shift in the conceptualization of learning during the last decades, and this is evident in Figure 2, a double-page spread from a recent physics textbook for upper secondary school. If we compare Figure 2, which represents concepts in Einstein's theory of relativity such as simultaneity and relative time with earlier physics textbooks, we become aware of a striking difference. We see that the approach to the reader is very direct, especially if we consider the thought experiment illustrated in Figure 2. Einstein's theory of relativity is demanding, and the double-page spread from Jerstad, Sletbak & Grimenes' book gives examples of what Kress has referred to as "what is to be learned". In the article "Meaning and Learning in a World of Instability and Multiplicity," Kress argues that there has been a focal shift in institutionalized education from teaching to learning. He claims that this points to changes in social power and authority. Furthermore, he states that we need to establish what follows from such "theories of learning. Crucially, we need to develop apt forms of assessment, metrics of learning which are appropriate both to the new theories and the new demands for a recognition of dispositions (Kress, 2008, p. 263).

In an educational context characterized by multiple learning resources and the demand to cope with multimodality and multimedia, it is important to keep in mind that the written word according to Kress is only one part of the multimodal message. Kress is concerned with the utilization of different semiotic resources and modalities for transcription and communication (Kress, 2010). He discusses how different modalities and sign systems are capable of communicating different messages and argues that it is of great importance to study how the different resources are used and orchestrated—how they play together.

When we address concepts such as meaning-making through pictures or writing, we may reflect on the nature of the different resources, their use and the connections between them, and we therefore draw on examples to illustrate our points. This way of reflecting is of course a method. Qualitative methods are also frequently useful when we analyse the pages of educational textbooks, webpages or short films. Such study requires qualitative methods capable of the in-depth analyses of the resources in question. Cope and Kalantzis argue that our contemporary educational culture is one of multiliteracy. They discuss the changing roles of the school and the educational system, the multicultural society, different text practices and the significance of new media in literacy learning. In particular, these scholars draw attention to three basic aspects: namely, that literacy is a question of design and transformation, that literacy is multimodal and, finally, that there are no rules for adequate use of literacy. This implies that we must understand an expression in relation to how it functions in a given context (Cope & Kalantzis, 2000).

If we return to Figure 2, there is no doubt that this double-page spread from the physics textbook has the highest number of meaning-making resources and that it places the heaviest demands on the reader. This is, however, not a reasonable comparison given that the old history textbook (Figure 1) is designed and published for students in primary school, whereas the physics textbook is designed for students in upper secondary school. The transformation of the text is dependent on its use in a social context, for example in a classroom where the teacher as well as the students study the textbook pages, work on tasks and talk about illustrations, figures and contents. It is hard to be specific about the outcomes of such activities if we fail to take a closer look at the body-texts. We could therefore approach the text in a different way—for instance, with the use of text linguistics.

The recurring question is whether text linguistic approaches are theoretical or methodological. The two perspectives are often intertwined, as text linguistic theory can be adapted and used in very practical ways. In my view, the most advantageous aspect of a text linguistic analysis is the potential for linking all linguistic information in a text to other resources in a textbook.

CONCLUDING REMARKS

Text linguistic analysis is useful for analysing the verbal body-text, whereas multimodal analysis is often considered of secondary value. However, by using both of these approaches, we are able to combine all elements represented on textbook pages and thus observe which elements are the most salient. Through this analysis, we understand what will create an optimal learning resource for the students in question. Usually, the pictorial elements are the ones catching the eye in the first place, and therefore it is of utmost importance that the pictures and additional illustrations function in accordance with the verbal body-text. In many cases the body-text might be coherent and well-structured, but if the illustrations are not fully integrated with the contents of the text the learning potential is not optimal.

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UNDERSTANDING TEACHER ACTIVITY WITH EDUCATIONAL RESOURCES. SELECTION, CREATION, MODIFICATION, USE, DISCUSSION AND SHARING

ERIC BRUILLARD

INTRODUCTION

The research work carried out within the framework of IARTEM, devoted to school textbooks and educational media, initially focused on what concerns the book as an object: its content, its modes of production, its modes of selection (approval commissions or teachers' choices), its readability, representations of minorities, underlying ideologies, discourse, images, etc... The seminal book of E.B. Johnsen (1993) covers most of these issues. See also Knudsen and Selander (in this volume), and Rodriguez and Tânia Braga Garcia (in this volume).

In this chapter, we propose a very different perspective, not oriented towards books or digital resources, but towards teachers. We consider educational resources to be at the very heart of the teacher's work.

We believe that questioning the relationship that each teacher has with educational resources is central and that it is an important direction for the research to be conducted in the fore coming years within IARTEM.

In this text, we will begin by setting the context for the increased importance of online educational resources in relation to teachers' work. We will then give some reference points on the theoretical and methodological frameworks adopted in the ReVEA research project and in other related projects. Finally, we will present the main results obtained and propose some perspectives.

CONTEXT

We are doubtless in a context of change, in several respects.

The most obvious change concerns the transition from paper to digital, with a lot of different hybridizations. We observe the spreading of digitized infrastructure and the explosion of individual use of digital objects (the Internet of things).

It is not only a question of instrumental change. Social and even societal transformations are taking place: Google is a sort of modern oracle that could bring an answer to any question; social networks; smartphones… generate new relationships with knowledge. We observe changes in truth regimes and the recognition that there is no longer a single discourse to transmit in schools, but contrasting points of view, in a sort of post-modern vision of the world.

Concerning schools in developed countries, an inexpensive and reliable infrastructure is in progress, offering new possibilities, notably with digital resources. While the textbook occupied a central place (which it still often occupies), it is supplemented by multiple other resources, notably retrievable via Internet. The situation of educational resources goes from scarcity to abundance.

Traditionally, a teacher has to respect national prescriptions, select educational resources (official textbook if available or legitimate resources), adapt them finely to the group he or she has to manage. Sometimes, he or she shares resources with peers and benefits from educational resources created by colleagues. He or she clearly is between end-of-pipe adaptation and collective design.

In this new context, teachers bear an increasing responsibility concerning educational resources, because of less external authority and less or no validation or legitimization. For example, with the Internet offer, some countries, such as Norway, have decided to cancel approval commissions and trust teachers.

The importance of resources in education is also increasing: new subjects, new knowledge, multiple views… New pressure, from students and parents, expecting visible quality of documents (presentation and readability), up to date data… and also new kind of resources, *reactive* (or interactive) resources, support of diversified activities.

With Internet, some have thought that teachers' preparation time would be reduced, since they would find many resources ready for use. Yet, there has been a significant increase in preparation time.

So understanding teacher's work is really a key issue. That is what we have done in the ReVEA project (and other connected projects led by the French Ministry of Education), devoted to better understanding a phenomenon in evolution and unfamiliar processes, aiming at answering the question: how and why teachers select, modify, revise, share, and discuss educational resources.

THEORETICAL AND METHODOLOGICAL FRAMEWORKS

ReVEA, in French "ressources vivantes pour l'enseignement et l'apprentissage" means "lively resources for teaching and learning". The project is connected with educational resources but mainly with teachers individual and collective activities. Resources are alive through the communities that support and sustain them.

We articulate several research frameworks. First of all, didactic frameworks have been used

- Instruments / actors / systems (Baron and Bruillard)

- Curricular investigation (Martinand)

- Documentary approach to didactics (Gueudet and Trouche)
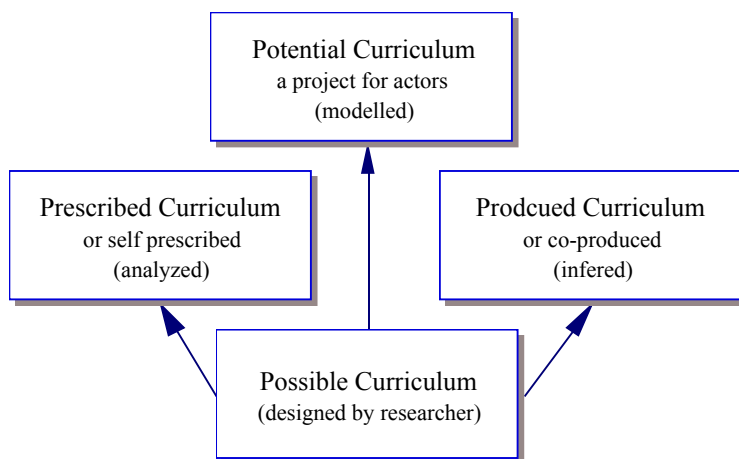
- General didactic approaches

Figure 1 Curricular investigation, components of researcher view (Martinand)

The curricular investigation approach (figure 1) is particularly suited for our context. Hansen (in this volume), speaks about learning material with *potential* effect. It can be linked to the notion of potential curriculum (what teachers can do) in the curricular approach.

As we mainly focus on an activity, a major reference is activity theory. The Leontiev approach is particularly adapted. Distinguishing three levels, activity/ motive (why), action/ goal (how) and operation/ condition (process/ affordances), this approach makes it possible to investigate with a broad perspective.

The activity/ motive level requires interviews, personal journal and logbooks (observation is not possible). The action/ goal has been investigated through re-peated interviews, observation and some specific experiments (asking teachers to prepare a lesson). The operation/ condition level is treated via observations. We have also used a specific record and think-aloud protocol (screen capture for a specific task, and sound, recording teacher commentaries during his activity).

We also had to deal with some technical issues: the organization of digital re-sources (which storage spaces; how are they organized?), which system (technical

and organizational) is used to find resources in this space, which life cycle characteristics of digital resources (deleting, archiving): pattern, criterion, temporality, which management of successive versions?

Furthermore, we analyzed the ecosystem of educational resource production and dissemination: publishers, ed tech, ministries and communities, teachers' associations; questions of law and ownership over educational resources, and public policies.

During the ReVEA project and other related projects, we conducted nearly 100 interviews. These constitute our major source of data.

MAIN RESULTS

Teachers' work on educational resources has been analysed around three main attractors: the teacher's personal characteristics and how they have been constructed over time; the processes associated with this construction and the corresponding productions; and the places and systems in which the activity is deployed.

Each teacher has to articulate personal values, experience and teaching knowledge, with characteristics of its working environment (local and global, infrastructure…), constraints, norms and potentialities. One key point is the history of professional and disciplinary identity building.

A very personal and human activity

Investigations revealed a great diversity of ways of doing (*manières de faire*) of teachers. The work on educational resources really is a core activity, at the heart of the teaching profession, very or even strictly, personal. The resources produced, selected, and modified reflect in a way the teacher's professional and even personal identity.

First of all, there is a great diversity of practices with their often very personal, even intimate character.

Teachers cannot be reduced to the simple status of a relay between resource producers and learners. They have values and preferences. They look for the resources they deem best suited for their pupils, according to what they want to do in the classroom, even if this means circumventing legislation on copyright and intellectual property rights. They choose what interests them and correspond to their interests even if it is outside the scope of the discipline they teach (for example, art history for a physicist or scuba diving for a technology teacher). It is still necessary to be able to judge precisely the methods of intervention of teachers, the intellectual and material resources they mobilize, the ins and outs of the initiatives they take.

This result has theoretical and methodological implications. If one wants to understand teacher's behavior, using questionnaires is not a good approach. Each choice may have a lot of explanations.

Some oppositions are relevant: novice/ expert; the idea of hacker (proactive in research and bypassing possible obstacles) and tuners; oriented towards their subject or their students. Taking into account their relation to professional literature, theories and constructed beliefs (experience), personal values, passions, interests (aesthetic quality) … is necessary.

The relationship with educational resources is in fact a personal construction within a system, according to encounters and professional experiences.

Time scales issues

When teachers work with educational resources, three temporalities intervene centrally: (1) the watch, a continuous process throughout the career; (2) the planning and general organization of courses, annually or several times a year; and (3) the preparation of lessons or courses that occurs several times a week.

The first one corresponds to a continuous process of documentation, reading books, magazines, watching movies, TV, collecting objects… A teacher, as a researcher, is a teacher almost all the time. The specific moments of preparation (2 and 3) can be observed. They require the use of computers, search engines…

A fourth temporality, which is very short, is that of the training action itself, i.e. the actual implementation with pupils, during which the teacher may be led to modify resources, to summon others, etc... But we haven't studied it.

Another temporality corresponds to the professional career and personal life elapsed since the initial training. This is the time of identity building, in which we can isolate the initial formation, the first years of exercise (from the novice to the experienced) and then the hazards of the professional career.

4 crucial processes: inheritance (transmission), participation, collection, trust network

Based on the analysis of several series of interviews with high school and college teachers from different disciplines, four central processes were identified (Bruillard, 2015).

The first, called transmission or inheritance, corresponds to one or more biographical episodes: teachers recover resources either during their training, mainly in the preparation for teacher recruitment competitive exams, or when they take their first post. Other teachers give them all or part of their preparations, either in paper form or in digital form, for example via a USB key. It is not only resources

that are transmitted in this way, but also ways of doing things, methods, etc...In the professional fields, it is necessary to add the resources transmitted by the professional circles, whether it is on request, during the visits of the tutors in company, or directly by the pupils themselves.

The second, less asymmetrical, is participation, whether peripheral or full and whole, in collective work, within institutions or larger collectives.

The other two processes correspond to continuous constructions during the career. It is the collection first. On the one hand, the resources they have received (by transmission or inheritance), modified, built (participation or personal creation), used in previous years for their teachings are organized in their personal spaces. On the other hand, they hoard general resources, in order to use them as much as necessary in their teaching: online video mailing lists for English teachers, rocks for geologists, machines for technologists, and so on. Successive inheritances can be stored in collections or left in bulk.

Secondly, teachers build a network of trust: people who advise them or can provide resources and who can be contacted directly or who have a site or a blog or an accessible warehouse, known sites that have resources that we trust (the site of a natural history museum, the site of a particular academy for a particular discipline, YouTube for videos, the site of the Ministry, even foreign sites, school textbooks, etc...). From experience, the teacher knows that he has a good chance of finding what he is looking for, and has confidence in the quality of what will be offered.

These processes (transmission, participation, collection and building of the trust network) structure the teachers' work over the long term, and produce results (collections, a network) that are available when preparing a course or lesson. And it is indeed this more punctual temporality that draws our attention here in priority, namely the individual work of the teacher for the preparation of courses.

More recently, we have explored cases concerning STS (Sections de Techniciens Supérieurs), post baccalaureate technical training, beyond secondary education. There is generally no manual and the link with professionals requires the establishment of a network of trust including different professionals. Quentin and Bruillard (2017) studied the practices of Bank teachers. The study confirms most of the results obtained within the framework of ReVEA and secondary school teachers and adds some specificities. Thus, information monitoring is a necessary activity, which is time-consuming and financed partly from personal funds (teachers buy professional journals in particular). The search, sorting, appropriation and archiving of resources are carried out according to a process that stabilizes over time. The rights attached to resources are rarely taken into account and the institutional platform for sharing and pooling resources is little used.

Connection with paper resources

As quoted in Bruillard (2007), following the ecotone metaphor of Horsley (2001), we can make the hypothesis of a hybridization of book and numerical technology, and between paper and digital.

'Biologists use the term 'ecotone' to describe an area where two adjacent ecosystems overlap – for example where a forest gradually turns into grassland. The ecotone has an ecology of its own. It can support forms of life not found in either of the adjacent systems. Today, there exists the educational equivalent of an ecotone between traditional learning environments and the emergence of new learning environments designed around student centred interaction and the internet and technology based learning tools.' (Horsley, 2001, p.38)

Our studies confirm that teachers' practices mix paper and digital technologies. The number of photocopies is increasing. As explained by Cuban, it is the way for teachers to have control upon documents they distribute to their students. One key explanation according to Khaneboubi is connected to writing skills. On the one hand, teachers will give copies with blanks to fill in order to make students write. On the other hand, giving paper copies is a way of overcoming their lack of writing skills.

So, it is not productive to focus on opposition between paper and digital as we can observe an important continuity of practices. Figure 2 summarizes the various processes detailed above as well as some of the questions raised by the transition from paper to digital.
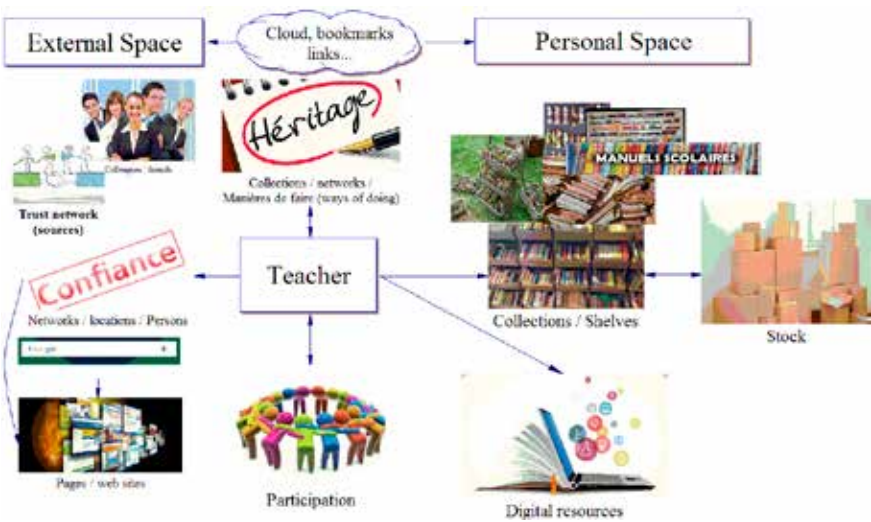

Figure 2. Processes about educational resources

The notion of shelf appears to be important. With papers and books, teachers can organize shelves to have a direct view of their educational resources. With computers, you can store a lot of digital resources, but it is not so easy to retrieve them when you need them. It is a well-known problem in PIM (personal information management), see Dikema and Olson (2014) and Loffreda (2017).

PERSPECTIVES

Our main aim is to advocate the interest of research approaches devoted to teachers' activities around educational resources, including both biographical studies (people's careers) and observations on the techniques used (research, archiving, organisation of resources, etc...).

A recent evolution corresponds to the multiplication of platforms, and in particular resource platforms, including services such as the addition of tests and the automatic collection of data on students.

Indeed, in France, there is a shift from paper textbooks, freely chosen by teachers and not labelled by the authorities, to directly financed products/services constituting a complementary offer, without the State being able to judge the very contents, only the adequacy of the object and the services provided to what is described in a kind of specifications, with strong pressure for teachers to adopt other forms of work. In fact, it is a question of how this supply of resources could be accompanied by other arrangements with a strong emphasis on teachers.

This kind of offer (platforms allowing to design scenarios including educational resources) relies upon an activity model of the teacher, an image of what a teacher does or should do which is very far from what our research has revealed.

In any case, we cannot underestimate the collective dimension of the teaching profession: teachers have to collectively control their resources, which could constitute a kind of Commons (Ostrom & Basurto, 2011), and the study of teacher networks (Quentin & Bruillard, 2013; Baron & Zablot, 2017; Beauné, 2017) is yet to be developed.

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FROM TEXTS TO IMPLEMENTATION AND PRACTICE. CONTRIBUTIONS TO RESEARCH ON HOW STUDENTS USE EDUCATIONAL MEDIA

FELICITAS MACGILCHRIST

What are people actually doing with textbooks and other educational media in schools? For decades, there have been calls for textbook studies to investigate how textbooks are actually used in classrooms: We know a good deal about the ideologies, discourse and factual (in)accuracies in educational media texts, but we have been able to say very little about how they are taken up by teachers and students in educational contexts. Recently, however, a body of research on the use of media in schools has begun to emerge. This chapter maps this emerging field, suggesting that recent contributions can be roughly categorized as 'media effects', 'media usage', and 'media as practice'. Each approach comes with its own epistemological, methodological and political assumptions. Each opens up ways of understanding how educational media are used, and presents a view of what education is and should be. After sketching the contours of this field, I make a case for adopting a practice theory approach. This approach seems particularly well suited to exploring the complexity and 'messiness' of media uptake in today's schools, especially given the thoroughly mediatized world in which many young people are growing up today.

This chapter has been prompted by two observations: First, many of today's young people – all over the world – live thoroughly mediatized and digital lives. Smartphones, tablets, apps, interactive games, e-books, social media, alongside books, TV, LPs and radio play an undeniable role in everyday life (Bird 2003; Couldry & Hepp 2016; Hjarvard 2013). Yet there is a puzzle in educational media studies: Research in this field often tends to investigate media products or educational technologies in isolation from one another. We are often not yet grappling with the whole, complex, 'messy' sociotechnical ecology in which young people are living and in which their use of textbooks and other educational media is embedded. Second, for decades, there have been calls for textbook studies and/or educational media studies to investigate how teachers and students are actually using textbooks and other educational media (Höhne 2003; Stein 1977). Even today, it is often claimed that there is very little empirical research on the use or effects of these media. However, a glance at recent research across a range of disciplines shows that there is an emerging body of empirical studies on educational media use, media effects and media practices. Although IARTEM has been at the forefront of this discussion, providing a vibrant international and interdisciplinary forum for exchange, these studies often remain dispersed and fragmented. Researchers are working with paradigms from cognitive psychology, instructional design, computer science, sociology, cultural studies, media studies, teacher education,

literacy studies, etc. The studies are based on quite different research interests, are embedded in different disciplinary conversations, and are being publishing in disparate journals. This means that scholars rarely engage across disciplines, and therefore do not build on insights from other disciplines.

The triple question thus guiding this chapter is the following: where are these contributions emerging; what kind of empirical approaches do contemporary studies take; and which key findings have emerged so far? The focus is primarily on young people's use rather than teachers' use. The approach undergirding the chapter is an interest in the cultural politics of education and technology. I am interested in how students (and teachers) engage with educational texts, not primarily because I want to know if and how they are *learning*, but because I want to understand *how they make meanings* about the social world and *which norms, values and knowledge* they adopt, remix or reject. As Neil Selwyn has observed, how we use educational media or educational technology "is an inherently political question".

> [M]any of the issues that surround education and technology are the fundamentally political questions that are always asked of education and society – i.e. questions of what education *is*, and questions of what education *should be*. (Selwyn 2012, 217)

For Selwyn, "any academic account of technology use in education needs to be framed in explicit terms of societal conflict over the distribution of power." In this sense, approaches to investigating the uptake of media in education are also always already entangled in the distribution of power, even if they do not explicitly reflect on this, since they also make assumptions about what education *is* and *should be*.

To engage with the politics of this research field, this chapter provides a critical overview of current contributions in the field of educational media use. It draws on a classic three-part-division offered by media studies: (1) media effects, (2) media usage and (3) media as practice. Each of these three approaches could be said to be investigating the same "research object", albeit with the caveat that an "object" is always only constituted through a research design, methodology and onto-epistemology (Barad 2007). There is, I should note at the outset, as in every attempt at tidy categorization, a certain amount of overlap among the three groups. The categories should be understood as rough heuristic aids rather than tightly bound containers.

MEDIA EFFECTS

Media effects research asks what impact textbooks, knowledge arrangements, multimodal designs or media platforms have on students. Most of these studies prioritise learning outcomes for specific types of learning materials. Much media effects research focuses on comparing the impact of different technologies.

In the field of educational media research this often entails comparing print and digital technologies (but see, e.g. Griggs & Jackson 2017 for a comparison of open and traditional textbooks). Primary methods involve standardized tests and/or randomized control trials.

Overall, although individual studies often make the headlines, and news stories tend to imply that the findings of specific studies are generalisable to *all* digital/print technology, by reviewing current research on media effects, it becomes clear that the jury is still out on whether digital devices are *more* effective, *less* effective or *as* effective as print textbooks. Instead, it is clear that different types of media lead to improved learning outcomes in specific settings.

Several studies support the widespread enthusiasm for digital educational media. They show a *significant increase in testable knowledge using digital devices or e-textbooks rather than printed textbooks*. They show, for instance, that compared to static materials, interactive/animated/multimedia materials had a positive impact on undergraduates' understanding of statistics (Wang, Vaughn & Liu 2011); that students using a self-paced instructional method on personal mobile devices to engage with course material on English outperformed students (on a standardized test) using a printed course textbook (Oberg & Daniels 2013); that although any kind of independent silent reading (ISR) intervention improved global reading comprehension, students using a computer reading module outperformed students reading from a print textbook on text-specific reading comprehension (Cuevas, Russell & Irving 2012); that students using e-textbooks which had been annotated with additional insights by the instructors outperformed students using a print textbook on an open-ended test item, although both groups performed equally well on multiple-choice test items (Dennis et al. 2016).

Yet several other studies have identified *significantly poorer student performance when using digital compared to print technologies*, or have found *no significant difference* between the two groups. In a South Korean study, for instance, school pupils achieved better reading comprehension and showed less eye fatigue after reading with printed learning materials than with e-books (Jeong 2012). A study in the US found no significant differences in reading speed and reading comprehension when students worked with paper and computer based materials, but identified a significant difference in knowledge retrieval, with knowledge being more readily retrieved when presented in paper format (Noyes & Garland 2003). One US study examined the relationship between technology (e-textbook or print textbook) and university students' grades and perceived learning scores. It found "no difference in cognitive learning and grades between the two groups, suggesting that the electronic textbook is as effective for learning as the traditional textbook" (Rockinson-Szapkiw et al. 2013). A comparison of Kindle eBook reader, iPad tablet and printed textbooks found that although reading time was faster with the printed materials, there was no effect of the format in which texts were pre-

sented on reading comprehension (Connell, Bayliss & Farmer 2012). Comparative research on the effectiveness of interactive videos compared to illustrated textbooks in a German secondary school found that each format was equally effective in helping students to learn complex content (Merkt et al. 2011).

A number of meta-analyses of the effect of educational technology have now been published (e.g. Larwin, Gorman & Larwin 2013; Schmid et al. 2014; Tamim et al. 2011). One important conclusion they draw is that now "literally thousands" of studies have been conducted investigating *whether* digital technology has a positive impact on learning or not, we now need more nuanced studies comparing one kind of technology with another (or more enhanced) technology (in randomized control trials, etc.), in order to find out *why* one kind has a more positive outcome than another (Schmid et al. 2014: 272).

Reflecting on media effects research

Reflecting on this research, I would like to consider the fundamentally political questions about education and society introduced above: What do these studies assume education is, and what do they imply that education should be?

The perspective on media (the print textbook, the e-textbook, the mobile device, the video) enacted in these studies draws on a stimulus-response view which has been critiqued in media studies (see, e.g., Couldry 2004). The medium floats relatively context-free; the interest in the reader/user lies in potential differences in their specific states before and after the intervention. The student is thus seen in their role as a "trivial machine" which responds in a generalizable and recurrent way (von Foerster 1997), rather than in their complexity and undecidability. Although some studies using standardized tests and randomized control trials are also interested in student attitude and motivation, by far the majority focuses on cognitive learning, i.e. immediate, short-term learning; the acquisition of accurate knowledge about specific content; conceptual learning oriented to improved assessment outcomes and exam performance. Clearly, it is not surprising that the learning sciences are interested in learning. This is a sophisticated field of research which is developing rapidly. However, as educational philosophy has argued, the increasing predominance of the learning sciences in discussions about education is leading to a "learnification" of formal education by narrowing the understanding of 'education' to 'learning' (Biesta 2013).

In the discourse of learnification, learning can be planned, tracked and assessed; learning is seen as a neutral, apolitical, universal, psycho-cognitive process; education becomes an instrumental technology (Friesen 2013; Ramiel 2017; Williamson 2017). Thus, also for media effects research, education *is* arguably about planning this learning, and *should be* about strengthening these controlled and controllable processes. For Biesta, however, the weakness of education, i.e.

"the fact that there will never be a perfect match between educational 'input' and 'output'", is not only a defect to be addressed and overcome, but also "the very condition that makes education possible" (2013, 3f.). Education, in this alternative understanding, is about uncertainty (Britzman 2009; Lather 2010); it is a complex, dynamic and undecidable process of becoming; it is a process of negotiation and translation, of provocative exchange among agonistic positions, of encountering radically different others; "educational encounters are about exchanges that have the potential to transform the ways in which we think and speak" about relatively firm ideas that we hold about human rights, democracy, citizenship, society, etc... (Todd 2009, 154). Much contemporary policy, research and practice focuses on learning – and this transfers to much research on media effects – obscures that learning *is also* about the experience of anxiety, helplessness, dependency and frustration (Britzman 2009), or that learning *is also* disruptive and generative (Hickey-Moody, Palmer & Sayers 2016).

MEDIA USAGE

A second set of studies investigating the use of educational media aims to find out *what users are doing* and *what they report about what they are doing*. These studies, which I will group here as "media usage", often draw on survey and interview methodology, or, more recently, analyse the kind of digital data which online textbooks generate. Further methods to study what exactly users are doing while they use educational media were showcased at the IARTEM conferences in Berlin in 2015 and Lisbon in 2017, and include think-aloud protocols, screen capture for specific tasks, personal journals written by students, scoring guides for different activities, and eye-tracking devices (e.g. Behnke 2016).

Much of the published literature orients to user experiences: for instance, studies track students' experiences with e-textbooks, finding that the high enthusiasm at the beginning of a pilot project drops to much lower enthusiasm by the end of the project (Johnston et al. 2015); that students' intention to continue using e-textbooks is driven by their satisfaction with e-textbooks (Baker-Eveleth & Stone 2015); that students using an open textbook (Flat World Knowledge) report very similar experiences to those using a high-cost commercial textbook from a major publisher (Nelson) (Johnston et al. 2015); that they are fairly dissatisfied with the philosophy textbooks used across Brazil (Fonseca, Marcante & Garcia 2016); or that "technology savvy" has a salient direct impact on students' experiences of using e-textbooks (Sun & Flores 2013). Student course evaluations have indicated for over 20 years that interactive digital educational media, when designed and implemented well, have made lectures more interesting, and reinforced lecture and textbook materials (Davis et al. 1997). The value of print textbooks for students (Vieira & Garcia 2016) and for teachers has been discussed. Studies have identified the criteria teachers use when selecting textbooks (de Souza & Garcia 2016;

Garcia 2014; Zambon & Terrazzan 2013), and have reported that textbooks are useful building blocks for in-class work (Ding 2014), helpful in the preparation phase (Yildirim 2006), and a tool for professional development (Arnold 2013; Ding 2014).

E-textbooks lend themselves to data mining approaches, with a burgeoning set of studies analysing the log data generated when students use web-based e-textbook infrastructures, e.g., logs showing exactly how much time a reader spends on each page, which pages they look at, how frequently they use the e-textbook, and how they engage with the interactive activities – such as note-taking, highlighting or starting/pausing videos – offered by the e-textbooks (e.g. ElAtia, Ipperciel & Zaïane 2016; Peña-Ayala 2016, see also Merkt & Schwan 2016). Log files have shown, for instance, that most (university) students do not read the assigned texts. However, they also show that students choose to complete additional exercises (which are not included in their course credits) to help them study for exams (Fouh et al. 2014). Similarly, regular exams do seem to encourage students to spend more time reading their textbooks: Students in university courses that have frequent quizzes or exams use the materials far more frequently and "cram" less at the end of the year before their exams (Seaton et al. 2014).

These media use studies have a good deal of practical importance for instructional design, and have fed into the development of international standards for the use of teaching and learning materials in classrooms (Horsley 2014). The methodology used in these studies means they value what practitioners and students report about their learning materials and their professional and educational experiences. Implementing these findings will undoubtedly impact everyday educational practice.

Reflecting on media usage research

I would like to reflect on these studies by again considering the politics of the media usage approach, and the assumptions about what education is and should be which undergird the leading methodologies and research questions.

The perspective on media here sees the people involved in education as intimately linked to media. The primary emphasis is on people's relationships with specific platforms and technologies (see Couldry 2004, 119). An understanding of education is implied in which education is not only about testable knowledge and academic performance, but also, and primarily, about learning (and teaching) as an active engagement which may help reduce socio-economic inequality. Education should be about sustained, motivated engagement which opens pathways to opportunity. One objective of many studies in this field is to inform instructional designers or teachers about how to improve not only cognitive learning, but also users' engagement and their level of satisfaction with the

resources, sometimes also for the purpose of retaining students and reducing drop-out rates.

In this sense, users are not seen as trivial machines within a stimulus-response model. Instead, the focus is on individual media "users". Recent research has suggested, however, that when educational technology start-ups configure their imagined users, they encode a set of priorities into their technologies which recast the relations between young people and the education system "in terms of services, consumerism, usability and efficiency" (Ramiel 2017, 2; see also Selwyn 2013; Selwyn & Facer 2013; Watters 2014; on differences between for-profit and not-for-profit companies, see Macgilchrist 2017). Formal education is becoming increasingly entangled with commodification, the attention economy and aesthetic capitalism (Ball & Youdell 2009; Böhme 2016; Davenport & Beck 2002; Franck 1998). The concern is that an emphasis on individual users and their engagement with textbooks and other educational technologies forecloses to some extent an (alternative) emphasis on the structural and institutional support necessary to provide opportunities for young people to learn successfully and to participate actively as citizens who interrogate structural problems, who question the ethics of data mining, or who organize in community to address socio-political inequalities (see Barron et al. 2014; Parker 2007). Questionnaires and similar instruments also lead to findings which look "tidier" (more clear-cut) than methods for observing the "messy" practices in schools. These findings may thus oversimplify the situations they aim to describe and/or explain.

MEDIA AS PRACTICE

A third set of studies assumes students are living "in" media within multiple, myriad, complex socio-political contexts. The interest here is in "media as practice", albeit with "practice" as a fuzzy concept with multiple meanings. On the one hand, "practice" quite straightforwardly refers to "anything people do" (Ortner 1984, 149). In this sense, the logging data on media usage referred to above also generates understandings about "practices". On the other hand, media scholars have been orienting more explicitly to practice *theory* in which "practice" refers to "a temporally unfolding and spatially dispersed nexus of doings and sayings" such as cooking practices, voting practices or correctional practices (Schatzki 1996, 89, see Bräuchler & Postill 2010; Couldry 2004; Spitulnik 2002). One goal of practice theory is to overcome old debates about the primacy of structure or agency, and to look instead at the tangled webs, junctures, flows, doings and general messiness of social life. Analyses of media practices often adopt observational methodologies such as ethnography, which attend to the *richness and complexity of what students and teachers are doing*.

There is currently still very little research on educational media, or educational technology, which takes a practice approach. However, a few substantial

empirical studies are available. Studies have ethnographically observed how students and teachers engage with different kinds of texts (Dalla-Bona 2013). Several recent studies have observed digital media practices in schools, exploring how Minecraft is used as an educational medium (Dezuanni, O'Mara & Beavis 2015), or spending time in "ordinary" classes (Livingstone & Sefton-Green 2016), in high-tech schools (Sims 2017), and in programmes aiming to bridge the digital technology participation gap (Barron et al. 2014). Ethnographies have illustrated how the same textbook is used in multiple ways in different settings (see André 2013). In studies across different continents, similar patterns of interaction have been identified, of which I will highlight three:

First, printed textbooks are enacted as authoritative media. Among the many media used in class (interactive digital apps, television, websites, audio materials, etc.), students attribute authority primarily to the printed textbooks: their accreditation process, their physical materiality, their semiotics create an aura of authoritative knowledge which students pick up (Ahlrichs 2017). This authoritative knowledge leads to the unquestioning acceptance of certain common-sense understandings of how the world works, e.g. the theory of history which sees past-present-future as a segmented, linear, causal chronology, embedded in a progress narrative. This commonsensicalness hinders a questioning of 'western', 'modernist' epistemologies, making it difficult to visualise entangled histories and mutual global dependencies (Ahlrichs & Macgilchrist 2017).

Second, media practices range among three engagements with these authoritative texts: (1) Reproducing dominant discourses by adhering to the authority of the textbook or of the teacher's interpretation of the text. (2) Remixing, inventing or recreating ways of engaging with the textbook, thus destabilizing predominant meaning-making with their own situated practices. (3) Resisting and interrupting the meanings on offer by "explicitly raising their disconformity" (Romero 2016, 171, see also Ahlrichs et al. 2015; Hillman et al. 2016).

Third, several publications on media practice focus on students' "tactics" or "lines of flight" which point away from expected uses of the textbook (Ahlrichs & Macgilchrist 2017; Macgilchrist et al. 2017; Mohn & Amann 2006; Romero 2016). Students demonstrate a keen awareness of how to use textbooks to get good grades, while simultaneously being playful, such as when a boy reads "Timbuktu" and calls "TIM-buktu" to his classmate, Tim (Macgilchrist et al. 2017, 353); when a group of boys tease the ethnographer by saying Germany behaved terribly during colonial times, not because of the genocide it caused, but because it did not have enough colonies (Macgilchrist et al. 2017); and when young people use the printed textbook as a wall behind which to exchange private messages (Ahlrichs 2017, 71) or clap the books closed with a bang to create an acoustic rupture in the everyday unfolding of classroom life (Mohn & Amann 2006, 14).

These studies on media as practice focus neither on cognitive learning or student engagement, but on how students enact youth culture in the classroom, on how they perform identities, on their playfulness, and on "the bodily side of educational interaction, the materiality of classroom practices, and the choreography of persons and things in the classroom" (Mohn & Breidenstein 2013, 5; author's translation). These studies explore how educational media invite young people to adopt the mainstream public discourse of their context. They also show the generative productivity of students' apparently "off-task" educational media practices. Rather than understanding these as time-wasting activities, they are instead read as small, guileful, minoritarian practices; as tactics that "play on and with a terrain imposed […] and organized by the law of a foreign power"; as tactical mobilities that "seize on the wing the possibilities that offer themselves at any given moment" and "make use of the cracks that particular conjunctions open in the surveillance of the proprietary powers" (de Certeau 1984, 37).

Reflecting on media practice research

Stepping back again a third time, and considering the politics of these studies of media as practice, I again ask how they see education. Formal education is observed as a set of mediatized practices which simultaneously address students as subjects who *reproduce* conventional social orderings and (global) hierarchies, and *interrupt* these conventional orderings with alternative orderings and non-hierarchies. Educational practices enact multiple shifts between opening up spaces for marginal knowledges, and closing down these spaces into conventional discourse and mainstream ways of knowing. These shifts can be smooth and seamless, but they can also be jarring and contentious.

An approach to education through observing media practices is "about saying yes to the messiness, to that which interrupts and exceeds versus tidy categories" (Lather 2006b, 48). Saying yes to the complexities and messiness of using educational media means seeing education as fragmented, ambiguous, undecidable, non-coherent, contentious (and thoroughly mediatized). Education – in this view – *is* about far more than (cognitive) learning, or even about students' and teachers' satisfaction with the ways they are engaging in learning. Education is about conflicts over power: about how these conflicts over what is worth knowing and feeling play out in everyday situations in the school, and about how these conflicts are entangled with learning. In this view, education *should be* about avoiding easy explanations by "taking into account the complexity and the messiness of practice-in-context" (Lather 2006a, 789).

This metaphor of "mess" has important epistemological implications for empirical research (Law 2004). At recent IARTEM conferences which showcased several studies on media effects, media use and media practices, the majority

highlighted the variability of what young people and teachers are doing with media. Numerous presentations ended with a clear "it depends". It seemed, however, that the presenters felt uncomfortable with their inability to provide clear models and typologies. A practice sensibility as I have outlined in this section, would not apologize for the lack of tidy categories. It embraces the variability and mess, and says "of course: it depends". The interesting empirical issue is tracing patterns and identifying the *specifics* of this variability. This implies a major shift in what counts as "credible" and "valid" empirical research (see Macgilchrist 2016).

CONCLUDING WORDS

This chapter has described the rich body of cross-disciplinary work which is emerging on educational media use. IARTEM conferences and publications have shown many different approaches to studying how textbooks and other educational media are used. The chapter has outlined the utility of media effects or media usage studies, for instance, their immediate impact on instructional design. Overall, however, if we understand education as a significant political space in today's societies where young people spend a lot of their waking lives, and if we understand students as complex beings in a mediatized world, then a practice theoretical approach to educational media use has much, as yet undeveloped, potential for exploring the contexts, complexities and conflicts entangled with the use of print and digital media in today's schools.

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PART 3

TAKING INTO ACCOUNT CONTEMPORARY CHALLENGES BY FOCUSING ON RESEARCH

B. CHALLENGES

REINVENTING SCHOOLS AND THE EDUCATIONAL MATERIALS IN THE DIGITAL SOCIETY

MANUEL AREA MOREIRA

INTRODUCTION

Here we provide a reflection on the educational transformations that schools as an institution must confront in the current context of the 21st century. It is suggested that schools reinvent themselves to educate children and youths to become educated citizens, with the skills, values and knowledge to help them cope successfully in the digital society. This means transforming the curriculum, school organization and teaching practices so that the Internet is used as a learning ecosystem. We end with recommendations for the digital transformation of educational materials so that they include a "storytelling" narrative to provide meaning to their pedagogical use, provoke students' emotions as well as cognition, present challenges and work projects, be interactive and multimedia, and provide a communicative environment such as a social network for all the members of class.

Like many other social and cultural institutions, schools are at a crossroads where paper books are being replaced by screens and electronic devices, where students are more comfortable using digital machines than their teachers and parents, and where information and communication is so overwhelming that learning can not be limited to receiving new content for later reproduction, but instead must consist of learning how to look for information, analyze it, reconstruct it and communicate it. This is an era of radical - not merely epidermic - changes that affect culture, knowledge and our social life. These transformations have direct consequences for the school institution, the professionalism of teaching practice, and the contents and learning processes that should be developed by the students.

The school systems in Western countries were hatched with a conception of education that was designed to respond to needs of 19th and 20th century industrial societies. The society of the 21st century in which we find ourselves represents a radically different intellectual, cultural and social scenario. Therefore, it is necessary to readjust and reformulate teaching methods, media, utilized materials and technologies, the role and functions of teachers in the classroom, study contents, activities and skills for development by students according to the new socio-cultural and technological context in which the educational activity takes place. That is to say, the school institutions must evolve from the conception destined to instruct for an industrial society to one for teaching in an information society.

TOWARD A SCHOOL OF ACTIVE LEARNING PEDAGOGY ONLINE

From an educational point of view, the Internet should not be defined as an object or resource that is added to teaching, but rather as a scenario in which to live, experience and learn in an invisible way (Cobo and Moravec, 2011) as a cultural ecosystem. In previous years, ICTs were incorporated into teaching as artificial prostheses that sought to improve the effectiveness of traditional pedagogy consisting of teaching by explanation. Current examples of this instrumental approach to the educational use of technologies are IWBs (Interactive Whiteboards), which are more successful with teachers who use them in lectures because they offer improvements and new possibilities for more effective and attractive explanations, or educational eBooks because they can display the knowledge to be transmitted in a more motivating and varied way than mere textual information.

In my opinion, the challenge should not be to improve the pedagogy of information transmission by adding technology to these processes, but rather the new challenge should be to use this technology as scenarios where students learn by facing relevant and significant problems, where students learn by creation, production and construction of knowledge, which should also be made public, exchanged and shared with others. It is the pedagogy of creating with ICT.

The basic principles of learning-by-doing and creating pedagogy have been around for one hundred years. This is based on the principles of the New School (Montessori, Dewey, Kilkpatrick, etc...), literacy theory (Freire), constructivist principles of learning (Piaget, Bruner), and social learning (Vigotsky), but they have been re-interpreted and adapted to the new social, cultural and technological contexts of 21st century society.

This reinterpreting means developing an active pedagogy or model of teaching-learning practice supported by ICT that fosters the following:

- Training students as active subjects that reconstruct and give meaning to the multitude of information obtained outside the school in the multiple media of 21st century society and develop the skills to use information intelligently, critically and ethically.

- Developing a teaching methodology characterized by questioning the monopoly of textbooks as the only source of knowledge and encouraging students to search for new information from various sources and technologies, as well as reflecting and critically checking data.

- Posing interesting and significant problems/projects so students themselves can articulate work plans and carry out necessary actions with technologies in order to build and obtain satisfactory answers in such a way that they learn to express themselves and communicate by means of diverse modalities and technological resources.

- Organizing tasks and activities that involve the use of technology by students and require the collaborative learning processes among students in the class and those in geographically distant locations.

- Accepting that the role of teachers in the classroom should be more as an organizer and supervisor of learning activities done by students with technologies, rather than as a transmitter of elaborated information.

21ST CENTURY SCHOOLS SHOULD REDEFINE THE CONCEPT OF LITERACY AND CITIZENSHIP

The integration of ICT into the school system should be analyzed as a sociocultural issue linked to the formation of citizens in the context of the so-called digital or information society, and should be considered one of the most relevant challenges for educational equal-opportunities policies involving access to culture. In addition to offering equal access to technology, Education (whether in formal settings such as schools or non-formal settings such as libraries, youth centers, and cultural centers) should prepare citizens to be more cultivated, responsible and critical because knowledge is a necessary condition for the conscious exercise of individual freedom and the full development of democracy. Equity in access and training in critical knowledge are the two sides of literacy in the use of digital technologies. Therefore, a number of English-speaking authors such as Jacobs (2010) or Beetham and Sharpe (2013), as well as Spanish authors (Perez Gomez, 2013, Various authors, 2013) pose the need for school education to change the aims and competencies required to be considered a cultivated, critical and democratic citizen in the new Enlightenment that digital civilization represents.

From this perspective, education with ICT should be understood as something more complicated than simply equipping the classroom with technological resources or giving each student a computer with Internet access (the 1:1 model). This is a necessary condition, but not a sufficient one. What is relevant, at least from a pedagogical standpoint, is to educate children and youths to acquire the intellectual competencies required to interact with the existing culture both in books and online, so as to recreate it in a critical and liberating way. They should be educated to know how to search for valuable information, analyze it and share it; to be able to express themselves in a cultivated way through a variety of languages, such as textual, audiovisual and hypertext. In short, they should be educated to become citizens who are literate in the new forms of culture in the digital age. Without these literacies for the whole population there can be no harmonious and democratic social development for 21st century society.

SOME KEYS POINTS FOR DIGITAL AND PEDAGOGICAL TRANS-FORMATION IN THE 21ST SCHOOL

Reinventing 21st century schools to educate cultivated, critical and competent cyber-citizens involves measures and ideas such as the following (Area, 2015):

- Organizing the curriculum around key competencies that students should develop and thus reducing the logocentric or encyclopedic approach that has been in force to date. Among these competencies, so-called "digital competence" stands out and should be conceived in an integral way to involve various literacies (reading/writing, audiovisual, informational, computational) so that students can acquire the expressive and representation formats of digital culture.

- Reformulating both initial and continuing teacher training to enhance the acquisition of digital competency as well as the pedagogical competency of using ICT. Both competencies (digital and pedagogical) are necessary for teachers to be able to plan teaching activities with ICT, be able to manage and organize groups of students working with technology, and be able to create and generate digital educational materials in online environments for their students. Therefore, it is suggested that the evaluation of this competency be included in teacher selection procedures and criteria. In addition, we highlight the relevance of using Web 2.0 for the continuing education of teachers through strategies such as MOOCs, webinars, social teaching networks and online training courses.

- Promoting the school, and not only the individual teacher, as the axis or unit for educational change with ICT. This means encouraging each school to develop their own pedagogical action plans with ICT so that they are elaborated collectively and involve the whole school community (the teaching staff, as well as families and other local social agents). The elaboration and implementation of these school ICT plans means bolstering the role of school ICT coordinators as agents of educational change. Likewise, schools should make themselves more visible online by creating their own web environments.

- Finally, policies are needed to change educational and school materials to lessen the paper textbook monopoly, and promote the creation and use of digital platforms or learning environments that are open, flexible, social and customizable. These should be based on a pedagogical model that encourages students to become creators of content and not mere recipients, and these platforms should facilitate collaborative experiences among both students and teachers from different schools for the development of work and research projects.

THE DIGITAL METAMORPHOSIS OF EDUCATIONAL MATERIAL

Finally, we suggest that the next generation of digital educational materials (DDM) for 21st century schools follow the following axes or reference principles of (Area, 2017):

- A educational material should include a "storytelling" narrative that gives meaning to its pedagogical use. Thus, the designer of the material must construct a didactic discourse or script that captures students and lends coherence to the different units or parts of DDM.

- The digital educational material should pose challenges to students that activate intellectual processes involving the comprehension, analysis, contrast and synthesis of knowledge. The key role of DDM is not only to be an artifact that represents and explains knowledge, but also to be a catalyst for students' mental operations that activate cognitive processes fostering valuable, meaningful and authentic learning.

- The DDM should "compel emotionally", and not merely activate the cognitive dimension of learning. Emotion must motivate students to use the material, become involved in the completion of tasks, acquire and work with contents, as well as communicate with their peers. In this sense, proposals for materials designed to foster learning by playing (known as the gamification approach) spur the emotional involvement of students with knowledge.

- The DDM should be interactive. The human-artifact interaction should provide a unique and personal experience to each student based on the actions performed on the machine. Big data, learning analytics and artificial intelligence currently allow technology to make decisions autonomously, based on the data stored for each student and the set of users to adapt the environment, tasks and educational content to their particular characteristics.

- The DDM should have a multimedia appearance, content and interface. Textual, iconic, audiovisual or sound expression must be intermixed as forms of knowledge representation, and converge to offer a coherent learning experience. These languages must also combine diverse knowledge representation formats such as short texts, narrations, comics, video clips, graphics, animations, diagrams, photographs, 3D scenarios, maps, infographics, and timelines.

- The DDM should provide a communicative environment in the form of social network connecting all members of the class, both among students and between students and the teacher. Messages can be sent individually

> or collectively to offer tools and spaces for collaborative work, as well as to publish and download files.

- • The DDM should provide a personalized dashboard to the teacher and each of the students. This environment should provide information about their activity, history, possibilities for customization in terms of content and interface, sending and storage of files, messages as well as a variety of statistics.

In short, the metamorphosis of educational material in the 21st century is not merely a change in technological format, but instead must be considered fundamentally as a mutation of the cultural narrative and pedagogical functionality of both educational materials and schools as educational institutions. The important thing is not the change of printed educational materials of the past to others more digitally and technologically sophisticated, but to properly train students as educated, critical citizens prepared to successfully face the uncertainties and challenges of 21st century society.

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TEXTBOOKS AND NEW TECHNOLOGIES

THOMAS ILLUM HANSEN

Does the coexistence of printed and digital resources provide potentially new methodologies for teaching and learning in schools? It is a question that is often asked in relation to technological developments and new types of digital learning materials in schools. The short answer is that it does not, but there is much more to say on this question.

In this article, it is argued that ICT makes a difference and has some potentiality, but the realization of this potential is determined by a multifaceted context. Therefore, there is not a simple but a complex causality that determines the effect of new technologies in didactic settings.

This general point will be exemplified and discussed with educational use of ICT in the Danish school as an extreme case. One can thus speak of an extreme case, which is at the same time critical. A considerable amount of money has been invested in digitizing Danish schools, and yet many challenges remain regarding educational use of new technology.

As an extreme case, the Danish example can be used to point out what is possible with massive investment, political pressure and targeted implementation. An important part of this is the development of new concepts and new theory on learning materials which helps us to understand the many aspects of using new technology in schools.

As a critical case, the example will be used to analyze more permanent structural challenges.

THE NEED FOR MORE PRECISE LANGUAGE ON LEARNING MATERIALS

One of the major challenges associated with new technologies in the Danish schools has been the need for precise language on learning materials. Ten years ago in 2007 where we founded the national knowledge center on learning materials in Denmark there were a lot of competing concepts on analogue and digital materials for pedagogical use in schools. Thus, it was necessary to supplement and to some extent replace a number of broad, fluid terms like "learning resources" and "digital media" with more precise terminology, which made it possible to analyze different types of learning materials based on their functions in an educational context.

We therefore introduced a broad learning material concept which included all materials and tools that are used as aids for learning purposes in an educational context. On this basis, researchers affiliated with the center have developed a number of taxonomies, including my own suggestion to distinguish between didactic, semantic and functional learning materials (Hansen 2010).

Didactic learning materials are characterized by having the didactic intentionality coded into the material so that it has built-in didactics which systematically attend to several of the following teaching tasks e.g. identifying subject-specific goals, communicating content, framing activities and tasks, supporting and guiding the teacher, and scaffolding the students. Known examples of didactic learning materials are textbook systems, subject portals, subject systems, self-study courses and teaching courses.

Semantic learning materials are characterized by having meaningful content but no built-in didactics. The didactic intentionality is thus linked to the concrete materiality of the situation through the teacher's didactic framing. Known examples of semantic learning materials are non-fiction texts, videos, websites, animations, simulations, fiction, film and computer games.

Functional learning materials do not have built-in didactics either but function as tools that are used to handle content and work processes in teaching through one or more of the following functions: production, reception, communication, evaluation, compensation, search, data collection, analysis, calculation and process management.

The development of taxonomies and, thereby, a professional language about learning materials has made it possible to carry out systematic studies of learning materials. A significant consequence of this is that it becomes clear that it is not enough to study digitization as a development from book to web or, more generally, from analogue learning materials to digital learning materials. There is a remediation of didactic functions in digital learning materials that carry on analogue traditions. Moreover, the development of a professional language about learning materials makes it possible to sharpen the analytical look at the intentionality and functionality of learning materials across media and technologies in an educational context.

In addition, it is relevant to point out another triadic concept: Bundsgaard and Hansen's distinction between different types of potentiality (Bundsgaard & Hansen 2009). First of all we can define possibility based on an investigation of the learning material itself, as a text and as a semiotic resource. Here, the learning material is present as *potential didactic potential*: that is to say, that we can see the potential in the learning material that could help support the teacher's teaching and scaffold student learning.

We can also define possibility based on learning material as a tool in use. Here, the learning material appears as *actualised didactic potential*: that is, we look at what actually happens when the teacher and his/her students use the learning material as a tool in the educational context.

Finally, we can define possibility based on the effects, and how the use of a learning material can make a difference – both to the students' learning and the teacher's teaching. Here, what is being registered is the learning materials' *realised didactic potential* as an effect, which becomes apparent and measurable over time.

I will try to make this more concrete and understandable with reference to a project. In Denmark we have conducted a major intervention project, the demonstration school project, on use of digital learning materials in 24 schools (Bundsgaard, Georgsen, Graf, Hansen & Skot it is published in 2018). The project was a Mixed Methods study. Based on both quantitative and qualitative methods we have reached a split answer to the question of the potentiality and effect of digital learning materials.

On the one hand, the use of digital learning materials does not provide potentially new methodologies. On the contrary digital learning materials are often affirmative. They confirm and amplify a tendency to teach in a very traditional way with emphasis on transmission and drills and skills.

On the other hand, the use of digital learning materials can scaffold new methodologies. But this scaffolding requires innovative didactic designs. An interesting finding is that innovative design for learning can be designed and produced by teachers and their team, but it can also be built-in and encoded into the learning material.

The distinction between different types of potentiality intensified our understanding that there is not a linear causality between the design and effect of learning materials, but a context sensitive use that requires more comprehensive studies of the context.

WHAT IS THE CASE AND CONTEXT FOR USING LEARNING MATERIALS IN DENMARK?

The digitization of Danish primary and lower secondary schools has been characterized by three major digitization projects. They are relevant in this context, as the scope of the efforts and the political will behind them have been instrumental in changing the framework conditions for the Danish market for learning materials. The first venture, "ICT, media and school" in 2000 was intended to strengthen the use of ICT in teaching by investing a total of DKK 323 million (about 43.378.900 EU, which is a lot of money in a country with less than 6 mil-

lion inhabitants) and supporting a variety of diverse projects. The second venture "ICT in primary and lower secondary school") followed in 2003 with a grant of DKK 495 million (about 66.478.500 EU), which was mainly aimed at procuring ICT equipment, teacher training and the development of online learning resources. Finally, the third and ongoing investment is a ministerial grant of DKK 500 million, which is supplemented by equivalent funds from the Danish municipalities, so that from 2012 to 2017 a total of upwards of DKK 1 billion has been invested for the purchase of learning materials, the creation of networks for teachers and heads of schools, respectively, as well as larger and more systematic demonstration school experiments with ICT. This massive venture has been coordinated within the framework of the common public digitization strategy 2011-2015.

If you compare the three investments, you can see that they have been driven by three different sets of logic. The first effort was driven by an experimental logic, investing widely in multitude of initiatives and development projects. As such, they served as a proof of existence. It is possible to carry out good teaching and exciting development projects with ICT.

The second effort was driven by an 'injection' logic, which attempted to kickstart schools and the market by providing direct funding for the acquisition of ICT equipment at schools as well for the development of digital learning materials in the companies that had won the right thereto in a competition.

The third effort, on the other hand, is driven by a systemic logic, which combines an agreement with the Danish municipalities to develop the ICT infrastructure with financial support, the creation of networks and demonstration school experiments. The financial support is intended to increase users' purchasing power and thereby boost the market for learning materials, while the experiments are meant to provide generalizable knowledge which can be used for dissemination and scaling up. It is tempting to regard this development with critical hindsight, at the expense of previous efforts. However, it is important to keep in mind that the projects are not synchronously comparable but sequentially and causally linked and a part of a coherent maturation process. It is thus clear that attempts have been made to benefit from experiences generated by the projects. The diversity of the first projects resulted in a more cohesive and result-oriented intervention in the second project, whose results gave some indications of how to ensure a better implementation of projects with long-term effects. Unlike the general and technocentric approaches of the first two efforts, which received direct funding, attempts have been made to promote digitization through didactic and organizational initiatives and indirect stimulation of the market for digital learning materials with a view to creating a sustainable development where ICT is used to develop subjects and schools. The result is a systemic approach which views ICT and learning materials in a holistic perspective.
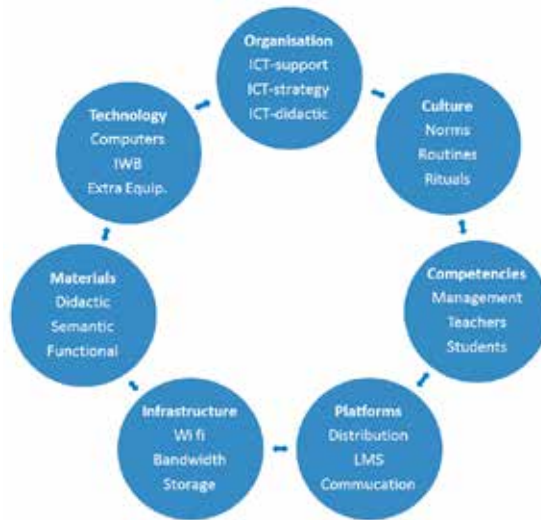
Figure 1. Systemic model for digital school development and the digitization of the market for learning materials

Figure 1 visualizes the simultaneity and coherence there has to be in digital school development as well as in the digitization of the market for learning materials. In order to promote this there is a new ongoing initiative in Denmark, a common digital framework so that all municipalities can offer their schools a digital solution consisting of three basic elements:

1. A collaboration platform for ongoing communication, knowledge sharing and cooperation concerning all parties involved in primary and lower secondary education.

2. A learning platform for the planning, implementation, evaluation and sharing of courses, including the management of student plans, student portfolios, curricula, test results, student satisfaction and various types of didactic, semantic and functional learning materials.

3. Dashboards, i.e. user interfaces which collect and visualize the most relevant data and features, giving users an overview of and quick access to functionalities like schedules (day/week/month), communication, course, learning materials, student products and test results.

The systemic model in figure 1 clarifies, however, that this process is dependent on many element and contexts. Regardless of how and at what pace the implementation will take place, it cannot avoid having a profound impact on learning materials in Denmark. The producers thus use the financial support for digital

learning materials to prepare for a future market in which there will be much more competition as regards links to curricula, visualization and data integration, as well as dynamic business models which enable digital solutions to be targeted to the current needs of individual schools and municipalities.

In this context, it is an open question what role digital monitoring, measurement, collation and analysis of data about teacher and student behaviour will play for either data-driven or data-informed use of digital learning materials, i.e. whether the digital production of data for various forms of systematic feed-up, feedback and feed-forward will be used. This complex issue falls into the category of learning analytics (Siemens & Long 2011: 5, Ferguson 2012). According to SOLAR ("The Society for Learning Analytics Research) the concept of learning analytics is related to the concept of "business intelligence" used for software solutions which interpret and translate a large amount of data into simpler, user-friendly information in a business context.

Used in a learning context, the idea is that digitizing data about student behaviour and patterns of use can be used partly to provide teachers and other decision-makers with a deeper insight into and a more systematic overview of students' learning, and partly to create a better and more dynamic learning environment by automatizing parts of the ongoing feed-up, feedback and feed-forward, for example in the form of data-driven suggestions for topics, assignments, evaluations, collaborative relationships and focus points in relation to students' well-being and to inclusion and progression. As stated in *2015 NMC Technology Outlook for Scandinavian Schools: A Horizon Project Regional Report*, expectations are thus quite high (Johnson, Adams Becker & Hall 2015: 13), but there is still no documentation that it will have the desired effects or whether, and how, the technological interactivity will affect social interaction in teaching.

The preliminary effect of the joint public digitalization strategy on the market for learning materials can be observed when comparing publishers' annual statistics. In 2013 there was an increase in sales of digital learning materials of 43.7 %, while textbook sales remained largely unchanged (Publishers' Association 2013: 2). In 2014, sales of digital learning materials increased by a further 16 % while textbook sales increased by 4.4 % (Publishers' Association 2014: 3). This means that the digital share of learning materials increased 25.4 % in 2013 and to 28.6 % in 2014. At the same time, it is worth noting that analogue sales did not fall but, on the contrary, rose in 2014. This rise requires several explanations. First, it should be noted that books are still a reliable and competitive medium. Second, with the elementary and lower secondary school reform new subjects were introduced into new grades, which created a need for new learning materials. Third, it seems that the financial support has enabled, at least temporarily, the establishment of a parallel strategy with which to uphold a tradition regarding analogue learning materials while at the same time introducing a digital solution.

POTENTIALS AND CHALLENGES

The technological development of the Danish school system points to the fact that a massive investment in digital learning and learning environments can make a difference, but it is not a simple transition from textbooks to digital resources. When we compare the described development with the results from the demonstration school project, it becomes quite clear that potential didactic potential is not necessarily actualized or realized (Bundsgaard, Georgsen, Graf, Hansen & Skot, in print). In fact, there are many indications that we should consider the relationship in reverse and invest more on research into use and effect for developing an evidence-based analysis of the potential of learning materials.

The results indicate that all these digital technologies do not exclude printed materials or make them redundant. Printing still has affordances when it comes to stability, portability, tactile embodiment, and continuous slow reading. Digital technologies on the other hand have affordances when it comes to plasticity, data processing, process management, monitoring and dynamic multimodality. Thus, the coexistence of printed and digital resources was used to scaffold new methodologies, but we have no evidence that learning materials are the driver. Didactic learning materials were most commonly used to carry on traditional education, while functional and semantic learning materials were to a greater extent included in new methods under the right circumstances. The question is, then, what is meant by the right circumstances. The decisive factor is a robust and well-founded didactic design that encompasses students, teachers, supervisors, and management and integrates them into a whole school change.

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TEXTBOOKS DESIGNED FOR STUDENTS' LEARNING IN THE DIGITAL AGE

BRUCE ALLEN KNIGHT

In this paper the author challenges the thoughts, practices and assumptions related to the creation, acquisition and use of textbooks and digital learning resources in the digital age. Firstly, the discussion centres on student characteristics in the culture of the knowledge society, and then examines the efficacy of textbooks. Sophisticated Individualised Data Delivery Systems (SIDDS) (Knight 2015) are then introduced as the new "textbooks" to utilise the benefits of digital learning resources. The chapter will describe principles underpinning a learner-centred design framework as aspects to consider when designing learning experiences for diverse learners in textbooks incorporating new media formats (Fasso, Knight & Knight 2013).

STUDENTS IN THE KNOWLEDGE SOCIETY

Web 2.0 has had an influential effect on students' behaviour where they believe they "belong" to a significant community that is linked in their own web spaces, where they share and participate with others in that community. What has become evident is that participants in these communities generally communicate spontaneously, want immediate access with a need for speedy responses and unfortunately any information communicated is usually not critically appraised for its veracity (Knight 2015). Students increasingly are connected through online resources, use socially-based tools to communicate, believe that digital games have benefits for learning, and that schools can use and access digital technologies for personalising learning (Project Tomorrow 2014).

Students today are of course part of a global knowledge economy which epitomizes the liquid information culture of the 21st century (Area & Pessoa 2012). The OECD (2013) regards critical thinking, communication, collaboration, and connection (being socially networked as well as synthesizing information) as the four pillars of the knowledge society to which schools need to respond. As the accessibility of knowledge continues to change, textbooks, learning resources and "knowledge builders" (Knight 2015) will have to also transform as students access and depend on a continuous flow of information. Bass (2012, 1) asserts that teachers need to have:

A growing appreciation for the porous boundaries between the classroom and life experience, along with the power of social learning, authentic audiences, and integra-

tive contexts, has created not only promising changes in learning but also disruptive moments in teaching.

This paper draws from the literature relating to divergent learners who participate in varying communities of practice. Therefore it uses research that relates to different learners including school students ranging in age from preschool to year 12, college and university students as well as adult learners working in different occupations. Although they are all learners who have different needs and abilities, what they do have in common is using digital resources to build 21st century knowledge and skills.

TEXTBOOK LEARNING RESOURCES

Textbooks can support students' knowledge of critical discipline facts by using an organizational framework that is progressive, well-organized, logical, and connective (UNESCO 2016). Instructors and students regard the textbook (although its fixed organization is changing) as an essential tool for learning in the digital era (Knight & Horsley 2013; Rockinson- Szapkiw, Courduff, Carter & Bennett 2013). Although the digital age has expanded teachers' content and delivery options, textbooks are still extensively used to guide practice (Horsley, Knight & Huntly 2010).

The Digital Textbook Report (Parsons 2014) together with other sources delineate the following as to why textbooks, whether printed or digital, are useful for students and teachers.

1. The textbook includes the body of knowledge that students are required to learn. It must be acknowledged, however, that originally textbooks were not really books but rather learning tools to scaffold student learning (Hill 2010; Knight & Horsley 2013).

2. Textbooks provide an organized structure for learning, rather than ad hoc material from the internet which can be unauthorised content and may not be peer reviewed.

3. Textbooks can have all of the relevant information in an organised structure that is sequenced, coherent and connective to study a discipline (UNESCO 2016). This format uses the Goldilocks model of resources (Heinberg 2011) where the knowledge and information provided is just right so students are not overwhelmed and confused by too much information which may/not be accurate.

4. Textbooks that are peer-reviewed present accurate and complete information that is written by disciplinary experts who engage students in the culture and conventions of the discipline.

5. Textbooks usually offer activities and quizzes relevant to learning and applying discipline knowledge. In new digital environments, multifaceted concepts can be presented as engaging explanations of complex phenomena. Well-designed textbooks, together with engaged and well-prepared teachers, are the most effectual means to improve teaching and learning (UNESCO 2016).

6. Textbooks can be accessed by students at any time

7. Textbooks can guide teacher planning and student learning but how they use the technology and materials varies extensively depending on teaching philosophies and the discipline taught (O'Reilly 2016; Slough, Cavlazoglu, Erdogan, Wakefield, & Akgun 2015). Knight & Horsley (2011, 2013) have developed a typology framework to explain the different uses of textbooks by teachers. The uses include core integration where the textbook provides the scope, structure, sequence and learning activities of the entire course; as a core resource where the textbooks have a substantial role relating to most of the course; as a related resource to reinforce students' learning; and as a related resource to support student learning.

8. E-texts can be used to consider student engagement with reading. Some digital platforms provide teachers with data on student reading habits of the resources. It is important however that students have access to the "Goldilocks model" of resources where the information and knowledge accessed does not overwhelm and confuse them.

9. Textbooks encourage students to personalize the text through highlighting and notes; completing self-paced activities; and links to teachers' notes to support content. It has been reported that the use of interactive resources assists and engages students to enhance their critical thinking skills (Knight 2015).

10. Digital texts also offer the exploration of models through simulations, accessing video and podcasts from discipline specialists. Students like using electronic textbooks, in some cases preferring them to traditional texts (de Oliveira, Camacho & Gisbert 2014; Knight, Casey & Dekkers 2017)

SIDDS (THE NEW TEXTBOOK)

Sharples, McAndrew, Weller, Ferguson, FitzGerald, Hirst, Mor, Gaved & Whitelock (2013, 6), advocate that on-line learning signifies "a new and disruptive form of education that transcends boundaries between formal and informal settings, institutional and self-directed learning, and traditional education providers

and commercial organisations". Because textbooks are so useful for both teachers and students, Knight (2015) professed that texts as a resource are essential in a 21st century world. He proposed that the new text "book" is essentially a SIDDS, an acronym that the resource needs to be:

Sophisticated (in that it contains a lot of complex information);

Individualised (so as to be flexible to meet individual student needs)

Data (contains information that can be linked to real-time data from such sites as Google Earth and NASA)

Delivery (various flexible technologies are used to access and generate information)

System (uses many forms of data and not a singular data source such as a textbook)

With this resource, students do not use a fixed product like previously using a "textbook", but rather they use SIDDS to access data and interact with a wide-range of information using multiple technologies. A resource can be created by teachers to teach any discipline using open educational resources. The following is an example of SIDDS in action.

SIDDS: Production Environment of integrated learning systems

Content providers offering digital alternatives to produce a set of tools to build and manage content (for example, *Inkling*, a San Francisco-based publishing platform), advocate that a SIDDS be created that is highly interactive, non-linear, and cloud-based. Inkling market their authoring platform, Inkling Habitat, to publishers. The SIDDS can assimilate all sorts of media such as video, audio, text, and photographs together with internet proficiencies such as searching and social sharing. Characteristics of the platform that are likely to engage learners include:

- Audio (where the learners can listen to musical scores and other files);
- Video (where learners control when and how long they interact with images);
- Content specifics permitting learners to study different aspects in greater detail;
- Images which can be enlarged and interrogated;
- Social sharing enabled to engage students; and
- Cloud streaming to access content at any time on self-selected devices.

While it is possible to wonder about the future of SIDDS, other factors will impact student learning and behaviours. How students perceive and use the resources represents the key to utilising the full value of SIDDS in a digital world. Learners need to understand complex information presented in SIDDS as they assimilate new incoming information with what is already known. Sweller (2008) uses the term cognitive load to optimise learning within each student's load limitations by accounting for the nature of the task (intrinsic cognitive load), the learning climate (extraneous cognitive load) and the knowledge and skill of each individual student (personal cognitive load). SIDDS therefore need to be designed to scaffold and engage the knowledge, skills, motivation, and strategies of learners to build self-efficacy, creativity and learner confidence (Belland, Kim & Hannafin 2013; Knight, 2015).

Designing Learning Experiences in SIDDS

Fasso, Knight & Knight (2013) have designed a framework to enhance on-line learning mediated by technology when using SIDDS. The framework is based on a taxonomy developed by Dettmer (2005) which integrates the cognitive, affective, social, and sensorimotor domains of personalised learning to actively engage students. "It (*the framework*) is designed to use the e-learning environment to support the development not only of disciplinary knowledge, but of attributes and skills that reflect the 21st Century expectations of graduates. The framework is informed by a focused review of research on a range of theory (*socio-cultural, networked and connectivist learning theory)* that have informed e-learning design in the past decade along with contemporary research about individualistic and social learning in a networked society" (Fasso et al. 2013, 45). The framework is not planned as a step by step linear process but rather offers a set of principles for practitioners to inform on-line design and learning. Although presented as separate principles about learning, they do connect and intersect with each other. The principles will now be outlined:

1. Learning occurs in a community of practice when students engage in learning in a sociocultural dimension. In the community data can be shared.

2. Learning is learner-centred in personally meaningful activities. The graphical features of the SIDDS can broaden learning to include multi-sensory learning modalities (Slough et al. 2014). This promotes favourable attitudes to and engagement in learning (Cooner 2010; Light & Pierson 2014).

3. Learning is flexible and based on individual needs. Technology offers prospects of activity differentiation for all learners (Light & Pierson 2014). For example, texts that are authentic with good graphics are ap-

pealing to all students, especially those with learning difficulties who are prone to giving up on work readily. These students can have particular difficulties with comprehension and are usually less persistent and easily frustrated by cognitively demanding knowledge discipline tasks.

4. Learning is resource-based, and technology-mediated. Screen created technologies with multimodal representation capabilities are replacing paper-based texts (Mangen & van der Weel 2016).

5. Learning is both individual, and networked. Students will spend a lot of time reading surface level text on screens in their personal life, but this reading is less immersive and hence does not require great personal cognitive load. Students will need to also engage in deep inferential reading of discipline subjects (which have high intrinsic load) as they navigate the SIDDS with the technology available to facilitate their learning (Sun et al. 2012).

6. Learning is cognitive, affective, social and sensorimotor. Learning with technology is a multisensory experience that involves ergonomic and emotional aspects as students physically engage with a device in their individual contexts (Mangen & van der Weel, 2016).

7. Learning is best when activities are purposeful and aligned with assessment. Sun, Flores & Tanguma (2012, p. 66) use a construct of e-textbook helpfulness to signify how "the learning experiences directly relate to the implementation of e-textbooks in terms of resourcefulness, usability, and enjoyability". Useful and interesting SIDDS are more likely to be engaging and therefore develop more favourable attitudes and impact positively on learning (Coller & Scott 2009; Cooner 2010; Light & Pierson 2014).

CONCLUSION

Students in the 21ˢᵗ century today are networked to retrieve and create knowledge. Textbooks, especially in electronic and interactive form, are significant in a personalized knowledge education world as they undeniably affect what is taught and therefore learned (Knight 2013, 2015; Knight & Horsley 2013; Stein, Remillard & Smith 2007; UNESCO 2016).

In this paper the author has discussed the many advantages of using textbooks and learning resources in the digital world. The new digital age textbooks were described as Sophisticated Individualised Data Delivery Systems (SIDDS) which are used to access, interact and generate data by using technology to meet individual student needs. The principles supporting a learner-centred framework (Fasso et al. 2013) to design activities to improve learning were discussed.

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A CHALLENGE FOR IARTEM IN THE COMING YEARS

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Despite the endless discussion about school reform and whether blackboards should be replaced by more attractive resources, schools tend to remain unchanged insofar as the prevailing memorization mode. Pedagogical practice tends to be conservative and does not evolve along with society. The consequences are discontent, boredom and lack of discipline among young people in current schools.

Primary and high school teachers, having to deal with different classes and different subjects, tend to rely on textbooks or internet resources for information. Therefore, innovative resources may spur innovative teacher action and education. So, a major challenge to IARTEM is to follow a line of research on the potential dynamic interface between flexible textbooks and digital resources. This research could suggest more attractive ways of learning vis-à-vis the different student profiles, including those with special educational needs.

We all have seen the massive bags carried by students on their way to school, containing textbooks, various additional books and, very often, a laptop or equivalent. Indeed, an influencing factor is that today's textbooks include many pictures which, while functional, could be more easily carried in digital format. Thus, digital resources may become a more flexible tool for schooling.

The texture of learning resources, be they paper or digital, should be constructed in a problem-based way, rather than in an exclusive descriptive way. Therefore, regardless of their degree of complexity, questions and problems should be included that challenge learners. Moreover, these questions should be included in strategic places within media, mainly at the beginning of chapters or sequences, and not necessarily at the end, to incite young people to *think critically* and to seek information to answer those questions and, consequently, to learn how to answer other questions in daily life.

The following questions seem like good issues for debate and research by IARTEM for the purpose of contributing to more attractive and efficient schools:

— Could the flexibility of digital resources play a key role in the service to all students and lead to interactive learning that addresses different student profiles, including those with special educational needs?

— Is it didactically possible to carry a digital device along with some additional resources on paper in students' schoolbags, and move towards an interactive approach?

— Could the heaviest part of current school textbooks be included in a laptop or equivalent device?

— One more and fundamental question. Will this model bring renewed enthusiasm to all students, respond to their own particular way of doing things, and develop curiosity for science and critical thinking?

These questions clearly involve a need for a line of research. But with respect to the basics of education, what is the main goal in our complex and information affluent society? In other words, faced with today's diverse sources of information, what is the great challenge for girls and boys? Is it not for schools to help them use their minds well? The first principle of the Coalition for Essential Schools (CES) proposes the following: "learning to use one's mind well; the school should focus on helping young people learn to use their minds well". Another principle is "Less is more: depth over coverage: the school's goals should be simple: that each student master a limited number of essential skills and areas of knowledge". Yet another principal is "student-as-worker, teacher-as-coach: the governing practical metaphor of the school should be "student-as-worker", rather than the more familiar metaphor of teacher as deliverer of instructional services. Accordingly, a prominent pedagogy will be coaching students to learn how to learn and thus to teach themselves".

These principles are reminiscent of the French pedagogue Celestin Freinet quoting Montesquieu (1969): "*une tête bien faite, non une tête pleine*" (a well-structured head, not a full head") or in other words: "we prefer well structured minds and experienced hands to full heads". To Freinet, an important tool was something similar to a portfolio, adopted by CES, which was designated as "*le livre de la vie*" (the book of life) accomplished gradually through daily work. So a student writes personal thoughts in their portfolio about what listening, reading and doing are.

The link between textbooks, digital resources and personal portfolios should be interactive and based on challenging questions and situations, far from exclusive expositive or complementary approaches. Because of their extent, those situations could be better included in digital media, but, while paper resources may tend to include the fundamental concepts of subject matters, both media should have adequate cross references to each other. As they work with functional and not-excessively-heavy textbooks, digital resources, current daily media, and situations from daily life, students should progressively register their essays in a digital or paper portfolio. In short, *what they write* is directly related to what *they think and what they learn.* Thus, portfolios could be a fundamental mode of assessment, complemented in other ways.

Given that students currently deal with diverse sources of knowledge in and out of school, what should the teacher's role be? Cooperating in an "active learning process". Individually or in groups, the teacher should assess students as they respond to situations contained in those different media, in order to lead students *to think critically* by writing their essays on different platforms.

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