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Researching Textbooks and Educational Media from Multiple Perspectives: Analysing the Texts, Studying their Use, Determining their Impact

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Introduction

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Researching Textbooks and Educational Media from multiple perspectives: Analysing the texts, studying their use, determining their impact

The theme of the 2019 IARTEM conference reminds us, that textbooks and educational media can and should continue to be researched from different perspectives, with various aims, and with relevance to a range of actors. Artifacts that are used as educational resources by teachers and students mediate between the world around the school, curriculum, and subject content on the one hand and students on the other. The relevance of studying the design of educational resources and their potential for fostering new insights, skills or competencies in students persists.

However, we know that the relation between learning resource and student learning is by no means straightforward. The student is an actor with individual conditions, needs, interests and intentionality. The teacher mediates to what extent and how the intended design of the educational resource is enacted, redesigned or even abandoned in the classroom. Furthermore, it would be naïve to neglect the influence of actors and contextual factors on different levels in the context that surrounds the classroom. All actors participating in or influencing the use of the educational resource are worthy of scientific study.

It follows, that the question of the outcome of learning resources is equally complicated. What kind of outcome are we interested in and outcome for whom? Are we interested in measuring student learning outcome, observe behavioral changes or map students' or teachers' perceived gains, motivation or critique? Under what circumstances can we generalize our findings from one specific educational resource design to other designs? Is the relevance of determining outcome of using a specific educational resource to make teaching more efficient, to show that innovative designs work, or do we contribute to theoretical development?

It is obvious that the continuous study of learning materials from various perspectives remains essential for student learning and students' development from a broader perspective, for promoting equal opportunity and for empowering teachers to support their students in their development. For those reasons, the significance of an international network of researchers dealing with the complex issues mentioned in this introduction can hardly be overestimated.

These proceedings show the diversity in objects of study, methodologies and theoretical bases that also characterized the exchange of insights and research at the IARTEM19.

The process behind publication of the conference proceedings

Everyone who presented a contribution to the Odense conference was invited to submit a paper for the proceedings. Alternatively, it was possible to submit more elaborated research papers for the IARTEM eJournal and the Danish journal Learning Tech. Manuscripts were to be written in English and not exceed 3.500 words. Emil Back Olsen (UCL) has been in charge of collecting the proposals and for the correspondence with authors. A review board of Danish researchers was assembled to ensure the academic quality of accepted papers in a peer review process and to suggest improvements to the authors. Trine Ellegaard (UCL) and Kamilla Bjørnskov Madsen (UCL) are responsible for the layout of the proceedings. Stig Toke Gissel (UCL) is the editor of the proceedings.

Presentation of the proceedings

33 texts were accepted for publication in the 2019 IARTEM proceedings.

The texts have been grouped in three main themes:

Theme # 1: Educational resources as texts

Subtheme 1A: Educational resources as texts: Analyses of design and learning potential.

Subtheme 1B: Educational resources as texts: The educational resource as symptomatic of or embedded in structural, conceptual or ideological constructs.

Studies under this theme either share an interest in investigating the design and learning potential of learning resources, or adopt a broader perspective by focusing on how structural, conceptual or ideological constructs are represented or appear in learning resources.

Theme # 2: Studies of use

Subtheme 2A: Students' use and outcome of using educational resources.

Subtheme 2B: Teachers' selection and use of educational resources.

Papers studying use of learning resources are focused on student use or outcome or teachers' selection or use of learning resources.

Theme # 3: Innovative design and the production process of learning resources (3)

The third theme explores design processes involving educational resources or the production of learning resources.

Educational resources as texts:
Analyses of design and learning potential

From the wall to the page: what does the school textbook do with paintings?

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Abstract

In order to know how works of art are used for teaching a foreign language, specifically how they provide knowledge about history, the study focuses on Spanish textbooks published in France between 1965 and 2015. Through the example of the arrival of Christopher Columbus in America, we see that the textbooks alter many attributes of the paintings and most of the time do not indicate to learners that history painting is a fiction that should be corrected by pedagogical discourse.

Introduction

Anyone who has learned Spanish in France with textbooks knows the importance of visual arts in teaching this language. Paintings, specifically, have been used for a long time, even for beginners at low levels. Most Spanish textbooks reflect and even exceed the school curriculum's prescriptions. They make works of art privileged tools not only to stimulate expression but also to discover the culture and history of Spanish-speaking countries. The so-called "authentic" images – not made to be used in a teaching context – also make the textbooks more attractive. They facilitate the comprehension of texts (Lenoir 2007, 167) and show the world in which the language lives (Puren 1984, 460).

The use of paintings is part of the didactic identity of Spanish teachers, and artworks are characteristic of most Spanish textbooks published in France since 1950. The widespread use of artistic images has been enriched over time, in close connection with technical progress. After the black-and-white drawings and reproductions of paintings scattered in textbooks of the 1950s to 1960s, and colour reproductions grouped in specific pages to optimize printing costs (1960s to 1970s), publishers finally integrated colour reproductions perfectly into lessons at the end of the 1980s. At this time, such images became didactic tools in their own right, on an equal footing with the text and to a certain extent, independent of it, to teach language and culture, especially history.

But the function of these objects is not self-evident. As a pedagogical production, the textbooks benefit from a "presumption of truth" (Choppin 1993, 104). The teachers consider that they "contain incontestable truths" (Lebrun 2006, 15).

The art historian E.H. Gombrich defines pictorial representation as a "transformation", a product of the "personality" of the artist, with his "tastes and his personal choices" (Gombrich 1960, 55). In the case of history paintings, the artist also represents his sponsor's point of view. This is why, when we see historical paintings in a Spanish textbook for teaching history, we have to wonder about the compatibility between artistic purpose and school discourse. We must check if the textbook gives the students tools to see the artistic processes used to create the partly fictional representation. In other words: with the textbook, will the student have access to knowledge about history or will the student come to believe in legends, idealized visions or dreams?

Theoretical framework

History of school subjects

For a long time, images were considered secondary objects and did not even appear in the table of contents of textbooks. Their function was to illustrate pages, prepare readings or facilitate text comprehension. Without pedagogical instructions, the only discourses about pictures were implicit elements such as the layout. For example, pictures might precede the text, to create an expectation. My own goal, from the perspective of the history of school subjects, is to analyze the triangle of "historical knowledge – art – didactic and pedagogical work", and to focus on the lessons parts that provide knowledge about language and cultural facts, leaving aside the exercises and grammar/lexicon pages.

By doing that, I will try to determinate if the Spanish language, as a school subject, has been a kind of "laboratory" for the emergence of new didactic tools, taking the textbook as a witness and an actor of this evolution (Hofstetter & Schneuwly 2019, 36).

Didactic transposition

Paintings are often used in Spanish textbooks to convey knowledge about history. But historical paintings have been closely related to political power. They were made on command or during official competitions. Many times, those paintings represent more about what "the power" wants to tell the viewer about an event than how the event really transpired. The textbook has to adapt scientific knowledge for non-specialist readers, who are sometimes very young, but the distance between reality

and the knowledge taught should not be too great[1] (Chevallard 1994, 35). When didactic support – here, the historical paintings – distances itself from the truth and gives only a partial knowledge or a deformed vision of the event, the pedagogic discourse can correct and complete the picture.

Discourse analysis (Discourse studies)

Pedagogical instructions, part of pedagogic discourse, give learners tasks to understand the meaning of the paintings – which have texture, lines, colors and dimensions. Of course, transposing the painting from a canvas to a glossy textbook paper destroys the effect of texture and touch. So, in the context of the textbooks, I will only study the other formal aspects of the artistic discourse.

I have already emphasized the frequent distance between historical knowledge and historical paintings. To reduce this gap, pedagogical instructions have to help the learners to realize how an historical painting is really operating: as a "transformation" or as a partly fictional construction.

With this analysis, I will try to determine if the pedagogical discourse effectively guides the comprehension of the artistic discourse in the context of Spanish teaching and learning (Charaudeau/Maingeneau 2002, Kerbrat-Orecchioni 2017).

Method and data sources

To study the sample, I chose a qualitative method – a content analysis – observing the material differences between the original works and their reproduction in the textbooks, specifically. From this observation, I deduced the effect of the material alterations to the meaning of the paintings.
The second step was a qualitative analysis – a discourse study – of the instructions to check if they correct or complete the possible biases of the paintings or the layout.

Subject: "The discovery of America"

To study the transmission of historical knowledge through art, I chose to focus on a founding event in the history of humanity: the first contact between Spaniards and Amerindians, often misnamed the "discovery" of America, dated October 12, 1492. The event, considered general knowledge, is important enough to be studied in almost all textbook collections.

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[1] "In other words, it is necessary that the knowledge taught and the knowledge which is, in a way, its epistemological guarantee with regard to society, are sufficiently similar." my translation

Complete sample

The analyzed sample consists of 10 textbooks published between 1965 and 2015 (high school level). The event is shown through 12 different images, some reproduced several times for a total of 18 reproductions:

4 history paintings
- Dalí (Spain), *The Dream of Christopher Columbus,* 1959
- Puebla y Tolín (Spain), *First landing of Christopher Columbus in America*, 1862
- Garnelo (Spain), *First tribute of America to Christopher Columbus*, 1882
- Zapata (Equador), *The meeting,* 1992

4 ancient images
- De Bry (Flanders), engraving published in his book *Discovering America,* 1494 (twice without date in the textbook)
- Durán (Spain), *Duran Codex*, engraving, c1550
- Anonymous illumination of a manuscript, XVI century
- Anonymous lithography (USA?).

1 postage stamp - Cuban postal service (Cuba), 1992[2]

1 mural - Anonymous (Spain) XX or XXI century[3]

2 cartoons
- Oski (Argentina), cartoon[4]
- Corne (Argentina), cartoon[5].

Final sample

Most of the pictures are neither studied explicitly nor clearly identified as didactic supports. Without instructions in the textbook, each learner or teacher can look at and interpret the picture in his or her own way. As I said, my goal is to understand how didactic discourse can give access to the meaning of the painting and to historical knowledge. I'm therefore focusing more specifically on works for which the textbook authors have generated a specific discourse – most of the time, in order to give instructions to the students. Only three images meet this criterion:

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[2] Without date in the textbook
[3] Without date in the textbook
[4] Without date in the textbook
[5] Without date in the textbook

• Dalí, *The Dream of Christopher Columbus,* 1959[6] (four textbooks)

• Puebla y Tolín, *First landing of Christopher Columbus in America*, 1862[7] (one textbook)

• Garnelo, *First tribute of America to Christopher Columbus*, 1882[8] (two textbooks)

Results

Formal aspects

Lines, forms and masses

The lines and forms may be reproduced with some elements sacrificed. One can observe paintings that are minimally cropped (a few centimeters on the margins) in the four different reproductions of Dali's painting[9].

Sometimes, though, the alterations have more consequences. Thus, Garnelo's painting is reproduced in two textbooks, in 2010 and 2015[10]: the first (Apúntate 2010), with a slight cropping (4.3% of the surface) at the bottom of the painting, which reduces the visibility of some elements but does not erase them completely. In the second (Buena Onda 2015), the layout of the textbook removes a big triangle from the lower left (11% of the surface). This accentuates the first cropping, without really changing the scene. More importantly, a wide margin (15% of the surface) on the right is removed, erasing a large portion of the Native American. This reinforces the massive presence of the Spaniards and accentuates the painter's bias. It becomes even more significant if we recall the context of the work, as I will do later.

Finally, the shapes and lines can be modified when an anonymous copy replaces the original Puebla y Tolín painting published in 2010 in Juntos[11]. Even if the general structure of the painting is the same, some significant details are modified. The copyist erased some Native Americans on the left and changed Christopher Columbus's standards. Despite all these differences, the label of the painting is exactly the

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[6] DALÍ Salvador, *El sueño de Cristóbal Colón*, 1958-59. Oil on canvas, 300 x 600 cm. The Dalí Museum, St. Petersburg, Florida, USA.

[7] Puebla y Tolín, Dióscoro Teófilo, *Primer desembarco de Cristóbal Colón en América,* 1862. Oil on canvas, 330 x 545 cm. Museo del Prado, Madrid.

[8] Garnelo y Alda, José Santiago, *Primeros homenajes en el Nuevo Mundo a Colón* (versión B), 1882. Oil on canvas, 300 x 600 cm. Museo Naval de Madrid.

[9] Publisher Bordas, *Cambios,* 2nde 1987, page 125
Publisher Didier, *Continentes,* 2nde 1987, page 172
Publisher Nathan, *Juntos,* 2nde 2010, page 152
Publisher Belin, *Así somos,* 2nde 2014, page 103

[10] Publisher Bordas, *Apúntate,* 2nde 2010, pages 94-95
Publisher Bordas, *Buena Onda,* 2nde 2015, pages 124-125

[11] Publisher Nathan, *Juntos,* 2nde 2010, page 144

one of the original work. The textbook authors therefore did not realize that they were using a copy and not the original.

In the image of Puebla y Tolín, one can also observe color alterations and the technical quality of the reproduction that can modify the perception of the painting. This alteration is visible too in the four reproductions of Dalí's The Dream of Christopher Columbus. In this case, modifying the color palette makes the painting dark and cold or bright and warm. These variations change the perception and meaning of the painting. For example, the intensity, arrangement and orientation of the white light can suggest a divine apparition. A general bluish or grayish hue would on the contrary recall a seabed or an autumn sky that reduces and remove religious references.

Dimensions

The works I have chosen are historical paintings in which dimensions are very important. The enormous painted surface reflects the greatness of the historical event and the spectator must feel very small in front of it. The scale of the textbook inevitably erases this. To feel the "aura" of the history painting, the student would need to know its dimensions. But in the eight reproductions, they are indicated only twice. It is enough to recall that most students are captive spectators without direct contact with the paintings. It is also enough to understand that it is difficult to recreate the original relationship between the work and the viewer in a textbook.

All these elements of meaning can easily be observed but there is a further out-of-frame element that is not always visible: the context of the work's creation.

Didactic discourses about historical paintings

Dali: between artistic prestige, personal dreams and historical facts

It is important to remind that these three paintings are not studied in chapters about painting, painters or art, but in chapters about history. Their purpose is to bring knowledge of history to the students. So, I will consider the works from this point of view, as products of an historical context and as bearers of knowledge, starting with the most represented painting in the corpus.

The choice of Dali's painting can be surprising for several reasons. First, it is used in an editorial and educational context where religious works have been completely eliminated. And yet, in the painting, one can see many religious symbols: crosses, the Virgin Mary, Christ on the cross, the bishop, etc. Among all

the paintings representing Columbus's arrival, this one seems to be the least realistic. The title itself is outside the field of truth since it refers to a dream.

But the painting may have been selected more for its plastic beauty and the painter's prestige than for the religious symbolism and meaning. With this painting, the students can have an aesthetic experience, an idealized vision of the event and discover a world-renowned Spanish painter. The religion is omnipresent in the scene even if there was no priest in the crew and if the contract between Columbus and the Catholic kings12 does not refer to religion. More than history, the work shows the influence of Dali's Roman Catholic mysticism, personal life and artistic obsessions (we recognize his wife Gala, a self-portrait, an iconic quotation of his Christ of Saint John of the cross13 and of another history painting: Velasquez's The surrender of Breda14).

Instructions to the learners

Dalí: In the first analyzed textbook (Cambios, 1987)15, the instructions develop the semantic fields of uncertainty, subjectivity and unreality16, while a single word refers to the notion of truth ("realidad" [reality]). The expression «supuesta realidad histórica» ([supposed historical reality]) even hypothesises the non-existence of this truth, which is so important in the textbooks.

The 17 instructions ask students to make an iconic description, then an analysis of the pictorial processes and finally an interpretation. The instructions use the term "discovery"17 (although it is not really a discovery of America) but the art terminology is rich, technical and adapted (canvas, composition, picture, work, surrealism, hyperrealism, overlay, procedure, aesthetic value18). It contributes to giving artistic and linguistic knowledge in the field of art. One of the instructions ("for who knows"19) even assumes that the students know more paintings of Dali and that his work is part of a shared culture.

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[12] *Capitalutions of Santa Fe*, April 17, 1492.

[13] Dalí, Salvador, *Cristo de San Juan de la Cruz*, 1951. Oil on canvas, 205 x 116 cm. Kelvingrove Museum, Glasgow, UK.

[14] Velázquez, Diego, *Las Lanzas* o *La rendición de Breda,* 1535. Oil on canvas, 307 x 371 cm. Museo del Prado, Madrid, SPAIN.

[15] Publisher Bordas, *Cambios,* 2nde 1987, page 125

[16] "trata de" [tries to], "supuesta" [supposed], "según" [according to], "impresión" [impression], "irreal" [unreal], "efectos especiales" [special effects]

[17] descubrimiento

[18] lienzo, composición, cuadro, obra, surrealismo, hiperrealismo, superposición, procedimiento, valor estético

[19] "para quien conoce"

In the first questions, students have to think about the link between the painted scene and reality. But without any further documents, this is difficult to answer, especially on the subject of the importance of religion in Christopher Columbus's project.

The didactic guidance thus enables the acquisition of knowledge of the painter as well as a technical analysis of the painting, but it does not document the event. In this historical topic, students are not asked about historical value, even if the text deals with history.

In other textbooks (Continentes 2001, Juntos 2010, Así somos 2014), in a simplified version, the authors propose the same iconic and plastic reading that occasionally strives for interpretation and expression of personal opinion. But the historical significance of the painting is not discussed and its critical analysis as a history painting is not stimulated.

One can understand this choice with a painting entitled "Dream" because its name and form make clear the distance between the event and a reality or truth essential in a textbook project. But what happens when painters try to imitate reality?

Puebla y Tolín: About the Puebla y Tolín pseudo-painting, in Juntos 2010, students are asked to identify the historical event and the groups that are represented, and then to describe their attitude. They do not need to analyze or interpret because the painting is only used as a springboard document to practice oral comprehension. The analysis of questions shows that the goal is essentially to introduce some words the students need to understand the oral document. It seems that here the historical significance does not really matter to the textbook authors.

The special importance of the date of the painting, 1862, is not mentioned. One must remember that the Spanish empire began to crumble at the beginning of the 19th century[20]. Spain was therefore a country in deep decline, with dreams of past greatness. The Spanish state promoted this dream by purchasing the most monumental paintings that represented historical and glorious episodes, to exhibit them in symbolic places. Painters who desired to win painting competitions and sell their work had to be aligned with the official discourse

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[20] The first independence movements in Latin America began in 1810-1811.

In Puebla y Tolín's painting, religion is also very visible, and the trip seems to be focused on the religious project – in a similar fashion to Dali's. Puebla y Tolín's painting has been a source of inspiration for other painters like José Garnelo y Alda, reproduced in two other textbooks. Garnelo y Alda's painting (1882), realized in the same conditions and for the same reason as Puebla y Tolín, confirms this vision of the event. The addition of the cross in the last version of the painting, exhibited in the Naval Museum of Madrid, is part of this vision. For the two reproductions of this painting, the textbook authors also require an iconic description and a plastic analysis: students must identify the characters or groups in the scene and identify the event. They must also observe and interpret the attitudes. But they must additionally decypher the intention of the painter to "value" one of the groups. With this instruction, the textbook authors introduce – for the first time in the sample – the notion of "intention" and suggest a critical distance: that is, to question the historical credibility of the work and its apparent realism.

Conclusions and discussion

I have tried to show how textbook authors seek to give knowledge about a major historical event through art. Thanks to the textbooks, the students can acquire artistic knowledge, which should enable them to recognize famous painters. Most of the instructions encourage the students to trust in the work of art's ability to represent history. But when the pedagogical and didactic discourse does not introduce the notion of distance, this trust can become innocence, thereby limiting the acquisition of knowledge. A textbook with historical images may provide knowledge of simple factual information, but it does not provide keys to understand deeply the meaning of the artwork in relation to its "environment" (Gombrich 1983). These paintings probably tell us more about the context of their production than about what happened on the island of Guanahani on October 12, 1492. But most of the textbooks seem to forget or ignore this fact. They do not offer a counterpoint to the idealized vision of the event, or to the legend which is still largely predominant in today's school iconography (Rodrigues 1989). In this legend, the conquerors seem to be peaceful heroes inspired by faith.

With historical paintings, published textbooks are not self-sufficient for historical knowledge to be taught. Therefore, teachers must develop by themselves the skills and tools to discover and make students understand art in all its dimensions. In this way, they can teach a more objective history. It would be relevant to complement this study of textbooks with surveys of teachers or class observations to find out about effective classroom practices, and check if they complete or correct with their own discourse or with other discourses what the paintings show. This may reveal a limit in the publishing process, in which most of the authors of textbooks are experts in teaching language but not in history in art.

To complete this study, the paintings should be linked to other elements. If most of the pedagogical instructions do not introduce the necessary distance to gain historical knowledge from paintings, other textbook sources (literature, documentary films, historians' studies, archive documents, historical writings such as chronicles, Columbus's journal, etc.) might correct or supplement the artistic vision. In this way, one could formulate the hypothesis that the complexity of the textbook is a condition for providing historical knowledge though works of art. Without the interaction between different kinds of discourse, historical paintings, as fictional constructions, seem to be incompatible with the aims of education.

The latest evolution of the French curriculum21 (2019) resulted in the publication of eight new series of textbooks. The event is studied with a different purpose and the historical paintings used until now are not used anymore. It would be interesting to analyze what kind of material is used and for what purpose? Do they romanticize history to make it more entertaining and easier to understand for our times? Or do they prefer historical sources that are closer to a scientific approach? Do they choose Hispanic or other sources?

Finally, it would be interesting to study if the new textbooks have developed numerical tools to get closer to the experience of seeing a painting in vivo.

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[21] http://cache.media.education.gouv.fr/file/SP1-MEN-22-1-2019/70/3/spe585_annexe2CORR_1063703.pdf

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Textbooks

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CLEMENTE, Eduardo (dir.) *Juntos* 2nde, éditions Nathan, 2010

DUVIOLS, Jean-Paul (dir.) *Cambios* 2nde, éditions Bordas, 1987

MAZOYER, Elizabeth (*et alter*) *Así somos* 2nde, éditions Belin, 2014

Learning platform pedagogic: learning platforms as a pedagogical framework, pedagogical planning tool and time and place of learning

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Abstract

This article investigates learning platforms as a new educational resource for action and communication at school and is based on the research question: How can learning platforms be conceptualized as a category in pedagogical theory? The article presents a number of concepts that aim to highlight the role of learning platforms in the pedagogical science: as "pedagogical framework", "pedagogical planning tool" and "time and place of learning". The article has a theoretical aim and will examine learning platforms in a pedagogical perspective and thus help to develop a concept of learning platform didactics.

Introduction

Learning platforms are a new educational resource for action and communication at school, which constitutes a significant condition for teaching and learning and therefore both can develop and challenge teachers' pedagogical work. The term "Learning platform pedagogic" refers to the part of pedagogical science that is concerned with teachers' knowledge and practice in using and thinking about learning platforms. The article presents a number of concepts that aim to highlight the role of learning platforms in the pedagogical science: as "pedagogical framework", "pedagogical planning tool" and "time and place of learning". This article is based on the research question: How can learning platforms be conceptualized as a category in pedagogical theory? The article has a theoretical aim and will examine learning platforms in a pedagogical perspective and thus help to develop a concept of learning platform didactics. The purpose of the study is to strengthen teachers' pedagogical thinking and professional action.

Pedagogic is a knowledge resource that can be used both in teacher-professional and research contexts. In a teacher-professional context, pedagogic, on the one hand, can reinforce teachers' concrete planning practices by presenting a series of didactic categories that can be used to guide mentors in managing their planning and thus "provide teachers with practical actionable orientation" (Jank & Meyer, 2010, p. 19). On the other hand, pedagogic can also serve as a basis for teachers to critically examine teaching practice and support them in reflecting on teaching. Learning platforms can, in a pedagogical context, be seen as

a medium that sets new conditions for teachers' work and challenges them in their work. As Hacker says: "Media is becoming more and more external building blocks in the preparation of teaching and it is urgent that the teacher pedagogically understand and can incorporate such elements into planning." (Hacker, 1980, p. 14 - my translation).

The article contributes here to pedagogic as a research field based on research interest based on a critical position (Hiim & Hippe, 1997), which deals with how to develop and improve new practices and theory on the use of teaching technology in teaching. This position is inspired by Heimann (1976), in which pedagogic (in German, *Didactik*) helps teachers to establish a perspective and reflexive view of teaching and supports them in their professional work, thus helping them develop a reflexive approach to teaching, or "ways of considering the essential what, how, and why questions about their teaching their students in their classrooms." (Westbury 2000, 17).

The project thus links research into teaching and learning technologies from a general pedagogical perspective (Graf et al., 2012) and addresses issues such as: 1) What is learning technology and how to characterize it? 2) What role do learning technologies play in teaching and learning? and 3) What skills should teachers and students acquire to use learning technologies in their practice? (Ibid, p. 35). This is linked to questions 1 and 2, but with perspectives for question 3.

Learning platforms as technology in didactics

Learning platforms are a new emerging technology with special opportunities, challenges and issues for school practice. Learning platforms are not a transformative technology that can change and develop school practice by itself but is a medium of special educational affordances that take shape according to the school's and its teachers' knowledge, skills and attitudes toward learning platforms. Kirschner (2002) defines educational affordances as the characteristics of an artifact that indicate how it can be used within a particular learning context. The challenges for teachers' use of learning platforms are that they have a multifunctional and overarching nature. They are designed to be used in many contexts and in many ways, but do not instruct a particular use in a particular context. Another part of the challenges is that many teachers do not have experience in using learning platforms and are not trained to use them through their education; the platforms are not integrated as part of their routines or school teaching culture and are also not integrated into the pedagogic and didactic models that typically form a knowledge base for school practice (see, for example, Heimann, 1976; Hiim & Hippe, 2007; Jank & Meyer, 2006; Laurillard, 2012).

Therefore, it is central to focus on the role of learning platforms as technology in pedagogic. The question is whether one can talk about learning platforms as a new pedagogical category. A pedagogical category can be defined as a field of reflection and decision making for pedagogical organization, which allows the teacher to observe, adjust, decide and communicate about the educational organization (Hansen 2007). In the following, it is argued that learning platforms can be determined as an independent pedagogical category that requires special attention. The rationale is that learning platforms open three special decision fields for didactic acting and reflection: as part of the teaching framework, as a pedagogical tool for planning teaching, and as a place for teaching activities.

The extended didactic triangle is used as a basis for developing knowledge about the role of learning platforms in didactic practice. The didactic triangle describes a basic understanding of what teaching as a special enterprise is: someone (teacher) wants to teach someone (students) something (content) (Hopmann, 1997, p. 201).

The model is used here as an analytical framework for basic questions of educational organization: Why teach someone something? What is to be learned? How to organize learning activities? In what situations (time and space) should anyone learn? Under what circumstances should someone learn (the frame factors of teaching)? And with the help of what pedagogical tools can the teacher plan and organize teaching so that anyone can learn?
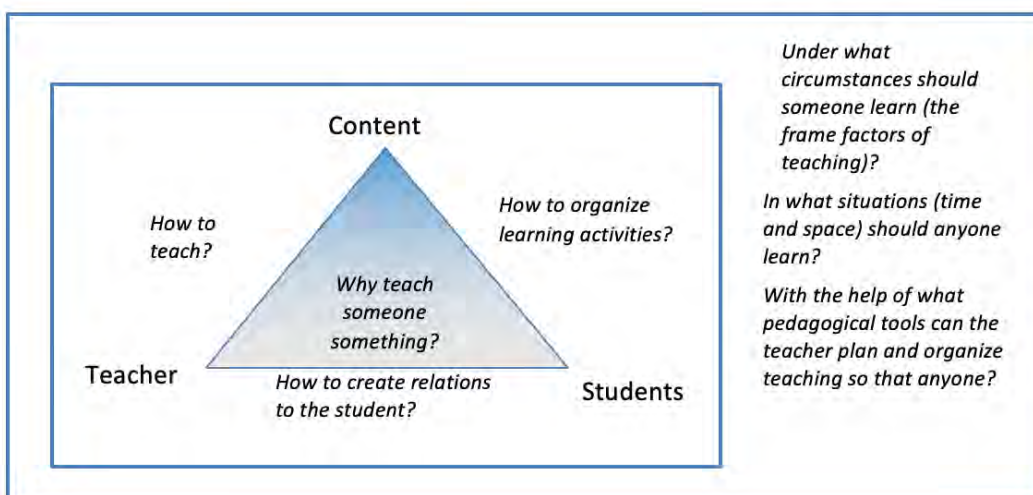
Figure 1: The extended didactic triangle

The model in Figure 1 thus extends the traditional didactic planning horizon with new fields of reflection and decision making such as the situation of the teaching and the didactic tools. The model reflects, on the one hand, an increase in the complexity of the teaching practice and, on the other, it frames which areas should be subject to a particular professional reflection and readiness to deal with the teaching practice.

Learning platforms as a frame factor

All a school's activities take place within certain limits. A frame factor is "conditions that can promote or inhibit teaching and learning in many different ways" (Hiim & Hippe, 2007, p. 155). For the Norwegian didactic scientists Hiim and Hippe, it is a point that teachers are aware of different types of frame factors "in order to see their own opportunities and their own professional scope" (ibid. P. 155). There are different types of frame factors at different levels. The frame factor theory is concerned with highlighting how societal and organizational conditions affect teaching opportunities for teachers and students, and typically frame factors are divided into two main groups (Kallós, 1973):

- Distant frame factors, which include the community's view of the school, e.g. laws, regulations.
- Proximal frame factors that relate to the enterprise in direct teaching: organizational frames (class size, exam arrangements, time frames), physical frames (e.g. premises), content frames (goals, learning technology), and personal frames (teachers' and students' attitude towards teaching)

Learning platforms are both a distant and proximal frame factor. Distant because their design and use are politically determined as a result of the national educational policy in Denmark in order to develop a common public ICT infrastructure for the digital support of the public school (KL, 2015). The goal is that "students, parents and educational staff have access to the student plan, student portfolio, digital tools, teaching materials and other content that the students work in." (ibid., p. 3).

The learning platform is also a proximal frame which influences the organization of teaching and learning. Learning platforms can partly be described as an umbrella of various services and functions where teachers can plan learning courses, share information with other teachers and where students, management and parents can access relevant information. Jewitt et al (2010) defines a learning platform as "an integrated set of interactive online services that provide teachers, students, parents and others involved in education with information, tools and resources to support and improve educational offerings and administration" (Jewitt, Hadjithoma-Garstka, Clark, Banaji, & Selwyn, 2010, p.4). Thus, a learning platform is not a collection of pre-designed teaching courses, but a collection of tools and services designed to support teaching, learning, leadership and administration, e.g:

- Teachers can use it to create and share learning processes; individually or in collaboration with a teaching team
- Students can access the learning courses anytime, anywhere
- Teachers can integrate a variety of their own tailored learning programmes
- Teachers and students can build and document the student's student plan
- Teachers and students have a place for direct communication and feedback on assignments and progress
- Teachers can manage annual plans, courses, schedules and student plans

Thus, learning platforms are a multidimensional phenomenon that can potentially influence both the organization and assessment of teaching. Learning platforms as a frame factor must, in a didactic context, be viewed in both a situational and a practical theoretical perspective. In a situational perspective, learning platforms act as a frame factor in relation to what a specific teaching is about and are in a mutual relationship with other didactic categories: goals, content, learning activities. In a practical theoretical perspective, learning platforms must be seen as a frame factor in relation to a teacher's theory of practice, which is a complex system of teacher knowledge, experiences, teaching routines and values underlying the teacher's pedagogical self-understanding and concrete practices (Lauvås & Handal, 2015). These experiences and routines are evident in the understanding that the teacher has of different teaching situations and attitudes to and use of, for example, learning platforms. The practical theoretical perspective implies that some teachers will have a positive and competent approach to the use of learning platforms, while others will have a critical approach (e.g., because the learning platforms do not fit the teacher's traditional teaching practice) or minor skilled approach (unsure of how to deal with learning platforms as a technological tool).

It can be argued that the following three areas are central as a basis for teachers' understanding of the learning platform as a proximal frame factor: 1) What opportunities and constraints does the specific learning platform have? 2) What is the school's educational practice in order to integrate learning platforms as part of their everyday life? 3) What are the organizational frame factors for using learning platforms, e.g. time for use, support for collaboration, opportunities for skill development and support?

Learning platforms as didactic tools

Didactic tools are the tools that teachers use to plan teaching, such as didactic models or didactic templates for describing didactic design in the form of teaching plans. As a didactic tool, learning platforms provide a special resource for teachers' planning of teaching and designing didactic designs. The organization of content and activities typically includes a structure and plan for the implementation of teaching, including the learning activities and tasks presented to the students. Furthermore, a didactic design can also include a description of the course's resources and teaching materials, assignments and assessment activities. A didactic design is a specific genre, understood as a recurring communicative pattern in a social practice and constitutes a recognizable resource for the production and use of texts. As a communicative pattern, didactic design supports teachers in designing and communicating teaching processes and students in understanding what teaching is about. Didactic design is at once a backward picture of the physical traces of the teacher's didactic work in his/her didactic workshop and a future concept of how teaching can be staged and students can learn and work in a future learning situation.

The teacher's planning of teaching through e.g. a learning platform can open a reflexive space for organization of teaching. One can understand the teacher's didactic design work in the light of Donald Schön's theory of the "reflected practitioner" (2001) which has the subtitle "How professionals think when they work". Teachers' planning does not reflect a rational, technical and instrumental practice where research-based knowledge and ministerial curricula are directly transformed into concrete teaching plans. Instead, Schön's design work is a complex, intuitive, experimental and dialogic process - a "conversation with the materials of a given situation" (Schön, 2001, p. 75). Thus, the materials of the given situation are both learning platforms and the task of teachers in designing teaching materials with regard to students, goals, own experiences, etc. The situation of planning within a context of learning platforms can to a great extent be understood as a dialogic and experimental process of a situation's materials, because the learning platform is a new planning medium.

A learning platform has typically integrated a course planner which is a didactic tool that allows teachers to design year plans, develop their own or integrate other people's teaching processes, formulate goals, integrate and organize content in the course, design assignments and provide feedback on student assignments. A course planner puts some rails to guide the teacher in his or her planning work, but the teacher is not bound to follow those rails. The teacher should be aware that a course planner is based on a specific educational basis, but this educational basis does not control the teacher's use of planning tools. When the teacher is going to use the "progress builder", he/she has to make a didactical transformation

of the structure of the course planner to his/her own intention (Hansen 2010). There are three typical strategies of didactical transformation that a teacher uses in order to use a course planner:

- Teacher-led planning strategy: The teacher follows the tool's suggestions closely to handle the didactic design process

- Teacher-aided planning strategy: The teacher complements the tool with his/her own ideas and integrates, for example, categories such as "activities", "methods", "teaching materials", "products" or "assessment" in his didactic planning.

- Independent planning strategy: The teacher redesigns the tool according to his/her usual practice and picks out the elements that make sense. For example, some teachers work on formulating goals in collaboration with the students or based on content and activities before setting goals.

Learning platforms as a learning place

Working on learning platforms highlights "where" and "when" as central didactic categories alongside the traditional categories of "what", "why" and "how" (Andersson, 2012). Where the classroom is typically taken for granted and thus also the didactic question of where and when, these categories are subject to special attention using a learning platform (Szczepanski, 2013). The report Learning Platforms in Educational and Didactic Practice describes the case of "Learning Platform for Sharing and Evaluation through Videos in Music":

In 5th grade music, it is a challenge for teachers when they have to interact with students. They are at very different professional levels: some play instruments in their spare time and others "cannot count to four" [e.g. rhythm]. Teachers therefore want to create a design that allows students to practice at home before teaching, more may be prepared for the hour, and teachers will be able to concentrate their guidance and assistance to fewer students per hour. Therefore, before the teaching, the teachers record videos with introduction to how to work with rhythms in preparation for the teaching and in the lessons. In the following video they show how two rhythms that the students have to work with during the lessons must be clapped. In the third video, they tell how students should continue to work on the composition of their own rhythms. The three videos are uploaded to the platform where students can find them from home. Pupils are encouraged in preparation / during the lessons to practice the rhythms thoroughly, film the final result and upload it to the platform via a channel on SkoleTube. (Anonymity)

The learning platform here becomes a digital extension of the physical classroom and a multiple learning place:

- a place for professional communication where students can be guided in acquiring rhythm skills
- a place of communication between teacher and student in which students can upload their learning outcomes to the teacher
- a place for gathering and preserving the student's learning expression and serving as a basis for formative assessment and portfolio pedagogy.

With the teacher's planning of a teaching course through the learning platform medium, there is also a building of a flexible and virtual learning site. However, learning platforms are not a unique learning place. The phenomenon of "place" is described by the Danish dictionary as "area or space with a specific location and limited size, e.g. where someone is, or something is going on". A place is thus a defined area for specific activities. But learning platforms are not a delimited place, but a *hybrid place of learning*, which is part of a complex interaction between classrooms, teaching material in the form of the textbook and the virtual classroom on the learning platform. It becomes a challenge for the teacher to develop a sense of this hybrid place, which the Danish dictionary describes as "the ability to find a way and recognize places and routes". Constructing places and routes in learning platforms means that the teacher understands the interaction between physical and virtual learning places. The teacher has to define the different places in a learning platform, e.g. as a library (where materials can be found), as a classroom (where teaching material can be disseminated), as a meeting place (where views can be exchanged and collaborated), as a showcase (where materials and products can be gathered and displayed) and as a workshop (where materials and guidelines can be found for the student to design products).

On the positive side, learning platforms as a learning place create multiple opportunities for students to connect with teaching communication and educational opportunities for just-in-time teaching (Novak, Gavrini, Christian, & Patterson, 1999). The potential is that students can develop and practice a skill in their work and receive guidance and support in the learning situation itself. The learning platform is part of a form of flipped learning pedagogy where video and other multimodal forms of representation can be used as professional dissemination and create space for exercises outside the classroom (Bergmann & Sams, 2012). Negatively, the hybrid dissemination creates an increased complexity for the students and challenges them to develop a focused participation in the virtual space. The pupil's challenge is to be able to orientate themselves in the different rooms, each with their own special expectations, tasks and activities at risk of learning "overload", ie. that some students do not have the cognitive capacity to understand and capture the intent of the teaching and its activities.

The teacher's challenge is to design multiple spaces for dissemination and organize them in a way that is clearly scaffolding and communicating, ie. that it is clear to students what to do, as well as how and why.

Conclusion

Learning platforms are a new external medium for action and communication in the school and constitute a special condition for teaching. They can therefore both develop and challenge teachers' didactic work. The concept of learning platform didactics refers to the part of didactics that concerns teachers' knowledge of and practice through learning platforms. This article has presented a number of concepts, fields of reflection and issues that aim to highlight the role of learning platforms pedagogic. The article has highlighted the importance of teachers developing a reflective, critical and creative approach to learning platforms because they have the potential to create new frameworks for teaching, new places for teaching, and new tools for planning teaching. Learning platforms are a medium that should, firstly, be designed and pedagogically transformed according to the teacher's own understanding of good professional practice. Secondly, learning platforms are a new technology that many teachers do not have experience with or are not educated in, and therefore it is central to experiment with using them in different areas of the teacher's practice, e.g. developing and sharing teaching courses, establishing new learning situations and testing new forms of assessment so that teachers develop a strong foundation for using, reflecting on and criticizing learning platforms.

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Pedagogical knowledge in the training of teachers: analysis of a textbook

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Abstract

The objective of this article is to verify the pedagogical knowledge present in the training of teachers by analyzing *Pedagogy and Teaching Practice* (2012), a textbook by Maria Amélia R.S. Franco that makes up part of the *Formation of Teaching* series, published by Cortez. Textbooks are both products and producers of knowledge and school practices (Bufrem; Schmidt; Garcia, 2006), as well as constructors of personal and professional identities. This qualitative survey was based on document analysis and content analysis (Bardin, 2011) to reveal the knowledge addressed in the textbook. To guide the analysis, the following themes and methodological references were found: pedagogy, didactics, educational practices, pedagogical practices, teaching practices, pedagogical subjectivity and dialogicity, and action research as methodological references. The results show that the book contains knowledge that can contribute to the training of teachers and provides a method of research that is pedagogically grounded for the use of teachers in school group practices.

Keywords

Introduction

The intention of this study is to explore the role of textbooks in the training of teachers and in their practice through a discussion of pedagogical manuals and readings for teachers. Its specific objective is to analyze the pedagogical-didactic knowledge in *Pedagogy and Teaching Practice*, written by Maria Amélia R.S. Franco, part of the *Formation of Teaching* series published by Cortez (2012). This series is part of a teacher education collection created to assist licensed and practicing teachers, and offering "[...] reference books for scientific, technical and pedagogical preparation" (Pimenta, 2012, p. 11).

The rationale for the research is the existence of gaps in the research analyzing pedagogical-didactic knowledge in textbooks for the training of teachers, as pointed out by Hegeto (2014). In this work, the researcher analyzed nine textbooks of general didactics with the objective of verifying the characteristics of textbooks that have influenced the trajectory of general didactics since the 1980s. This period of time is related to the political and social context of Brazil after the military dictatorship. From the 1980s, in a scenario of open politics, national education meetings multiplied and debates arose about the role of education and didactics in building a more just society (HEGETO, 2014).

Hegeto (2014) analyzed books from the 1980s, 1990s and 2000s. For this reason, continuing with his studies, we opted for the analysis of books published from the decade of 2010. We chose to analyze Pedagogy and Teaching Practice in Franco's book (2012) after a survey that identified 30 titles in the didactic-pedagogical area. For the literature review, we consider research on manuals, published since 2000, with the purpose of broadening the understanding of the trends of such research in Brazil. Another rationale is to contribute to the area of pedagogy and research in manuals and reading materials for teachers.

Textbooks aimed at training teachers

In this study, the term "pedagogical-didactics textbooks" refers to books and readings aimed at the initial and continuing training of teachers in the area of general didactics, rather than to books and readings in specific didactics. It is understood that pedagogical textbooks have the function of providing the necessary knowledge for the training of teachers, establishing by what forms understanding should be transmitted and assimilated and contributing to teachers' conception of identity (Silva, 2003).

The textbooks may also constitute ways of doing and of constructing education, producing professional and personal identities, and referencing and standardizing pedagogical practices (Bufrem; Schmidt; Garcia, 2006). They aim to explain school practices and legitimize teaching practices (Silva, 2003), at the same time trying to reconcile current practices with pedagogical innovations (Valdemarin, 2006). Textbooks also contain elements (concepts of didactics, teaching, learning and theoretical references) that permit an understanding of the pedagogical trends of teacher training courses in Brazil.

During the preparation of this kind of book, the authors adopt ideologies and preconceptions depending on their cultural context. According to Silva (2003), the authors select "essentials" from other sources; that is, they are inspired by ideas from other textbooks and books. The selection of these "essentials" for teaching practice implies what is "ideal" for the profession, which, in turn, confirms the authority to teach that which is considered important (Silva, 2003).

Methodology

Document analysis and analysis of content are the basis of the qualitative research. In the document analysis, the documents are consistent sources of information and content, made up of a rich source of data and new interpretations (Lüdke; André 2013).

For selecting the textbook to be analyzed, two kinds of documents were first considered: (1) books intended for training teachers, published in 2010–18; (2) academic publications, periodical articles, dissertations for masters degree and theses for doctoral degrees, published between 2000 and 2018.

The survey of academic papers and periodical articles derived from searching the following databases: Digital Library of Theses and Dissertations in the UFPR Library System; collection of the Brazilian Thesaurus of Education (Brased); Theses and Dissertations Catalogue from CAPES; and Google Scholar. Key-words and descriptors were used in the research: manuals for teaching to teach, pedagogical manuals, didactic manuals, manuals for teachers, teaching manuals, teaching to teach, textbooks for teachers and teacher training manuals. Initially, the survey sought publications from 2010 to 2018, but because of the lack of results, the search was extended by a decade.

Fifteen academic papers were found, among them periodical articles, dissertations from masters degrees and theses from doctoral degrees. Three of these corresponded to what Choppin (2004) categorized as research that uses the textbook as a historic document and analyzes its content, with distinct ends in view, such as: investigating the history of a theme or subject, analyzing the path of a subject, and studying the history of different teaching modalities.

On the other hand, the survey of didactic manuals consisted of searching for books in the digital collection of virtual bookstores and in academic libraries. Only the books produced by Brazilian researchers and aiming at the reflection and orientation of teachers' work, were considered. Thirty books/manuals were chosen which address general didactics, that is, which do not deal with specific themes, such as the use of technology or the application of a specific teaching method for a subject.

According to analysis of the summaries of these 30 books, it was verified that the books address the orientations and reflections on pedagogical practice and instructors in a broad sense. The books are characterized by the discussion of general didactic themes. These themes point to the potential of Content Analysis, because this type of analysis allows to understand the intentions of the textual messages produced by the authors of books (documents) (BARDIN, 2011).

Of these thirty books, *Pedagogy and Teaching Practice* was selected, written by author Maria Amélia R.S. Franco, and published in 2012. The selection was justified because of the number of editions of the book between the years 2012 and 2018, and the number of copies sold, which was 3,787. This number of sales

indicates the circulation of this book among teachers and students in training courses. According to the publisher, Cortez, almost 550 copies were sold each year.

The book was subjected to document analysis in order to reveal the pedagogical-didactic content and methodological references. The procedures proposed by Bardin (2011) were used for the analysis: pre-analysis, exploration of the material, and interpretation/inference/treatment of the results.

In the pre-analysis, a general reading of the material is carried out, with the intention of recognizing general characteristics of the material to be analyzed (Bardin, 2011). Next follows the delimited *corpus* of analysis, that is, "[...] the group of the documents taken into account to be submitted to the analytical procedures" (Bardin, 2011, p. 126). The delimited *corpus* corresponded to passages in *Pedagogy and Teaching Practice* which make the concepts, proposals and teaching concepts explicit for justifying the observations and practices in the initial and continuing training of teachers. The data was categorized in themes and methodological references and is presented in the following section.

Results and discussion of the data

The analysis of the book revealed seven themes and a methodological reference proposed by the author, as presented in the following table. This pedagogical-didactic knowledge will be discussed in the following sections.

Table 1: Pedagogical-didactic knowledge present in *Pedagogy and Teaching Practice* (Franco, 2012)	
Pedagogy	Is a social practice and science that organizes, comprehends, transforms, justifies and dialogues with the teaching practice.
Didactic	Is related to the teaching plan, the pedagogical practices and the students' acquisition of knowledge.
Educational practices	Concrete educational practices. Can be understood as social practices when acquiring intentionality and explicit objectives.
Pedagogical practices	Concrete pedagogical processes. Aims at being aware of, mobilizing and rethinking the teaching practices.
Teaching practices	Refers to the actions of the teachers. These are the practices that acquire intentionality and awareness of the teachers regarding their actions.
Pedagogical subjectivity	Is related to the Brazilian pedagogical thinking. It aims to understand how the pedagogical practices were interpreted historically.
Dialogicity	Is the beginning of dialogue in teaching. Socrates was its first historic representative and currently, Paulo Freire, in Brazil.
Action research	Is the methodology proposed by the author to transform teaching practice. It is addressed as instrument, methodology of research and pedagogical practice.

The themes present in the pedagogy and teaching practice manual

The themes will be presented in four subsections: i) pedagogy, ii) didactics, iii) educational, pedagogical and teaching practices, iv) pedagogical subjectivity and dialogicity. Sub-sections iii and iv are made up of more than one theme because they have conceptional relationships between them.

Pedagogy

The first theme is pedagogy, which the book considers to be a social practice whose objective is to organize, comprehend and transform educational practices.

> What is pedagogy, after all? Before being considered a science, it is established as a social practice for organizing education in a determined time and space, reflecting its adequate means and purposes, always seeking to comprehend and transform the educational practices, in a way that attains its established objectives (Franco, 2012, p. 48, our emphasis).

In the beginning of the book, pedagogy is also recognized as a science that justifies and dialogues with teaching practices, as is pointed out in this passage: "I speak of *pedagogy as a science,* in the sense of its historical construction, of theories and pedagogical practices" (Franco, 2012, p. 30, our emphasis). These two perspectives of pedagogy (as a social practice and science) show up various times in the textbook, revealing an important theme for the development of the author's ideas.

Didactics

The author constructs the idea that didactics is related to the teaching plan, through pedagogical practices and the students' learning of knowledge, as is highlighted at the beginning of chapter 3:

> In this chapter, I would like to discuss the issue of pedagogical practices, having as the background of the observations, *the central issue* of didactics. What would it be? Actually, such an issue is still related to the great question and proposal of Comenius: how to teach anything to anyone? We do not forget that *the logic of the didactics is the production of learning (among the students) by previously planned teaching processes* (Franco, 2012, p. 149, our emphasis).

Educational, pedagogical and teaching practice

In chapter 3, entitled "Pedagogical practices in multiple educational networks", the author reveals the theoretical basis of the construction of her ideas. It differentiates *educational practices, pedagogical practices* and

teaching practices. At first, these practices may seem synonymous, however there are approximations and distances between them.

Educational practices are presented as practices that reinforce educational processes.

Pedagogical practices, similarly, reinforce pedagogical processes. They contain five characteristics: i) they relate to the school culture and influence the social culture; ii) they involve collective actions, negotiated or imposed; iii) they contain intentionality, explicit or not; iv) they are an indicator of the particularities that qualify the educational processes of a society; v) they permeate teaching practices.

Teaching practices are the actions of the teachers. When these practices are not in line with the pedagogical sphere, they lose reflexivity, reinforcing the idea that teaching practices are not mere reproductions. This implies that these practices do not need a lot of investment to be materialized. Teaching practices need to be connected to pedagogical practices in order to acquire meaning and explicit intentionality.

Pedagogical subjectivity and dialogicity

The book also explores *pedagogical subjectivity*. This theme is related to pedagogical thinking and it is the way that "[...] the history, theory and pedagogical practices are interpreted by their protagonists" (Franco, 2012, p. 142). The author clarifies that pedagogical subjectivity was the instrument she used to understand the meaning of pedagogy for teaching practices.

Through this theme, it was possible to interpret and correlate the theories and pedagogical practices, as the textbook proposes. To substantiate the pedagogical practice, classic thinkers were used as theoretical references, like Sócrates, Comenius, Rousseau, Pestalozzi, and Dewey, as well as contemporary thinkers, such as Saviani, Libâneo, Pimenta, Bernard Charlot and Philippe Meirieu.

The author proposes dialogicity as a theme that deserves to be featured and explains that this "[...] principle will be resumed by many pedagogues, but especially by Paulo Freire" (Franco, 2012, p. 46). Throughout the book, this Brazilian thinker has historically attached to other educators and pedagogues. Franco (2012) privileges Paulo Freire because he is a historical landmark of Brazilian critical pedagogical theories.

Methodological references for teaching practice: action research

As a methodological reference for teaching practice, the book proposes action research. The author believes that only action research is capable of investigating teaching practices and points out the limitation of scientific research in collecting consistent and significant data together with the teachers. Franco emphasizes action research as an investigative and practical activity that can help teachers to break

loose from cauterized practices and help researchers to collect more relevant data, as is seen in the following passage:

> I consider that *action research could be an instrument to make the work of researchers more* potential, permitting them *to produce* more articulate knowledge for teaching practice, at the same time *offering teachers the opportunity to become researchers of their own practice* (Franco, 2012, p. 212, our emphasis).

The author stresses that the action research is an alternate methodology and pedagogical practice, whose objective is to produce educational knowledge and the formation of "critical and reflective research subjects" (Franco, 2012, p. 203).

To be effective, action research needs to comply with three prior conditions. First, the research methodology contains a specificity to transform the practicing subjects (the teachers) into a continuous, collective, shared, and prolonged process, not consisting of a mere collection of data from research in the field or the application of the alternate methodology in the class (Franco, 2012).

The second condition is the differentiated production of understanding and knowledge. For Franco (2012), the main researcher and the practicing subjects appropriately differentiate themselves from reality, in function of the roles they acquire during the action research process.

The last condition talks about the timing of the action research, that is, the simultaneity between the scientific research and the practice of teaching. Both happen at the same time, although at distinct levels and speeds, as well as with different implications for the perspective of the teachers and the main researcher (Franco, 2012).

The action research is structured into five pedagogical processes: dynamic construction of the group; resignifications of reflective spirals; redirection and evaluation of the practices; production of knowledge and socialization of understanding; and awareness of the new comprehensive dynamics. The dynamic construction of the group refers to the insertion of the main researcher in school. It seeks to mobilize professional cooperation and group planning for action, denominated as a group work contract.

The reflective spirals speak about the continuous observation concerning the practice, with the intention of the training of a critical-reflective teacher who is able to resignify its perceptions about the reality that surrounds it. Part of the reflective spirals lies in the evaluation of the practices. The evaluation should be referenced in the contextualized reflectivity grounded in the ethics and policies of the social environment. The moment of teaching practices transformation is designated by Franco as new comprehensive dynamics (Franco, 2012).

The action research aims at group action, reflexivity, planning and actions that transform society. According to the author, it is necessary "to make the teacher capable of better comprehending his practice

and in this way being able to transform it [...], in a movement that dominates [...] teacher researcher" (Franco, 2012, p. 183). In this sense, the action research is proposed as a research methodology and instrument inherent to the teaching practice, acting as mediator between pedagogical and teaching practices.

Conclusion

The purpose of the *Formation of Teachers* series is to have an effect on educational reality through the teaching and learning process, teaching being a specific field of professional intervention in social practice, which should be recognized and enriched.

Analysis of the textbook *Pedagogy and Teaching Practice* allowed the identification of the pedagogical-didactic content that makes up the book. Seven themes were analyzed, as part of the results: pedagogy, didactics, teaching practice, educational practices, pedagogical practices, pedagogical subjectivity and dialogicity. In addition to these themes, it was possible to describe the action research as a methodological direction.

The author, Maria Amélia R.S. Franco, seeks to justify this pedagogical-didactic knowledge with theoretical references, interconnecting them throughout the book to construct her thesis that pedagogy as a science can support teaching practice. This theoretical basis characterizes the book as a pedagogical textbook that proposes to be a reference for teaching practice. Another factor that contributes to this conclusion is action research, presented in the book as an instrument capable of connecting pedagogy and teaching practice. Action research is also addressed as a methodology of research and pedagogical practice with the power to transform the understanding and professional context of teachers.

These results allow us to conclude that *Pedagogy and Teaching Practice* contains pedagogical didactics that can contribute to the training of teachers, due to a rich theoretical basis and a research methodology associated with teachers' actions. It is necessary to continue studying the knowledge included in textbooks developed for teachers which can guide teachers in a formative process.

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Orality in the learning resources of L1

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Introduction

Orality is a central part of all education (von Oettingen, 2016). In mother-tongue education specifically, orality is also content, and education aims to develop the orality of the students. The student needs to learn how to make a statement, speak and listen, and to be part of many different oral rhetorical situations (UVM, 2019). Therefore, it would be expected that the learning resources of L1 would suggest ways for the teacher to teach orality.

At the same time, much indicates that orality does not play as substantial a role as content in mother-tongue education (Haugsted, 1999; Penne & Hertzberg, 2015). A "didactic of orality" is sought for (Aksnes, 2016; Høegh, 2017). In this project, the following is being researched:

How and to which extent is orality made content in three of the most frequently used learning resources for L1, as well as a theme-based, prizewinning learning resource with a specific focus on orality?

Learning resources are seen as a didactic foundation and a source of inspiration, both in the selection and organization of academic content as well as the selection of specific activities in class: "The textbook is the most dominant layout for the curriculum" (Hodgson, Roenning, Skogvold & Tomlinson, 2010: 87). The present study is a study of the intended use of the learning resources, and therefore it has no descriptive power over the actual use of the learning resources in the classroom. However, it is reasonable to assume that the learning resources play a significant role there (EVA, 2012).

The field of research is four didactic learning resources for L1. Fandango 5 is a textbook-based didactic learning resource, while dansk.Gyldendal.dk and danskfaget.dk are digital learning resources. These three learning resources have been chosen as objects of analysis given that they have been estimated in a quantitative study to be the most oft-used and best reviewed learning resources by the teachers (Bundsgaard, Buch & Fougt, 2017). The fourth, Ordet er dit, distinguishes itself by being a theme-based learning resource on orality. In 2017, it was the runner-up for the Ministry of Education's Learning Resources Award.

The analysis of the learning resources shows that only two of these explicitly both teach orality, and use orality to teach. For reasons of extent, we have chosen to only use analyses and characteristics of these two learning resources.

What is orality?

Theoretically, the study is based on a Nordic tradition of orality didactics, which particularly relies on Haugsted (1999), Dysthe (2002) and Høegh (2017; 2018), but with additional reliance on newer, Anglo-Saxon research in "dialogic teaching" (Wegerif, 2016; Mercer & Littleton, 2007; Alexander, 2017).

Orality is defined as "a communicative unit, in which bodies, looks, and gesticulations are included, and communicative sense is situational: the spoken language works in specific situations with specific participants, as well as specific purposes and functions, and all of the contexts dictate our interpretation and negotiations of meaning every time" (Høegh, 2018: 31, our translation). The project is based on a combination of a socio-cultural and a cognitive perspective on orality. When a person participates in a communicative situation in a specific social context, it means that the person has to implement the semiotic resources of orality, in order to make sense in relation to the specific situation as well as in relation to a specific oral text, which means that the person has to activate different cognitive processes. Thus, a movement is created between the outer social context and the inner processes of the individual where the oral text serves as a bridge between the outer and the inner (Bremholm, 2013). Therefore, orality has several different components including the individual, cultural, academic, linguistic and contextual (Penne & Hertzberg, 2015).

This is operationalised in the Triangle of Orality (fig. 1), which is drawn up with inspiration from Jers (2010) and Hoel (2001). Oral communication takes place in a here-and-now context, where sender and recipient are both present face to face. Factors such as gesticulations, mimics and looks influence our understanding of the oral content. The spoken language is complex, and closely linked to the individual and the situation. On a global scale, we see the oral situation itself (purpose, specific participants, contexts), genre and subject or contents. These parts are invisible in the oral communicative situation. On the local scale, we have the components of the language, the body, gesticulations, mimics, looks, sound discrimination and attention. These parts can be heard and seen in the oral communication. Our view of orality in a subject didactic perspective means that the teaching of orality in L1 should happen in relation to subject-related content.
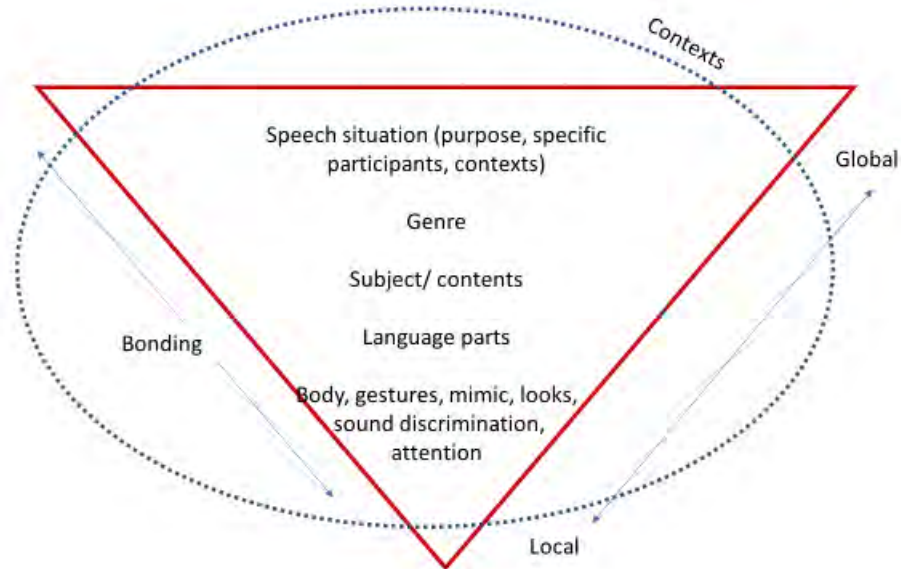
Fig. 1: Triangle of Orality (with inspiration from Olsson Jers, 2010)

Listening is an integrated aspect of orality (Høegh 2018). The concept of listening is extensive and has many nuances in meaning – depending on which parts of the listening process one is working with (Otnes 2016). In this project, the focus on listening is based on a social meaning – "listening to" something, e.g. listening attentively to a speech, a reading or a lecture, and "listening with attention and empathy" in dialogue with others, e.g. a conversation. Listening contains both a cognitive and a sociocultural perspective. The academic terms include listening acts, competences, purposes, comprehension, strategies, behaviour, and response.

Method

Didactic learning resources are aimed at teaching specific content in a specific subject (Hansen & Skovmand, 2011). Analyses and assessments in this project are conducted at a distance from the intended practice through textual analysis; they identify which possibilities for teaching and learning the learning resources provide to the teachers and students, the "potential learning-potential" (Bundsgaard & Hansen, 2011) of the learning resource.

The assessment is based on explicit ideas of what orality in L1 is, and what it can be (cf. the theoretic basis of the analysis). We emphasize that analyses and assessments are not conducted on the learning resources in their entirety, but are solely targeted at orality as an academic domain in L1.

The analyses are structured after the Triangle of Learning materials (Illum Hansen & Skovmand, 2011: 61). The Triangle of Learning materials have three basic elements: someone says something (expression) about a topic (content) to make others do something (activity) with a didactic intention (goal). This analysis focuses on the explicit goal, content, and activities of the learning resource, which makes it possible to study the relation between academic activities and academic objects.

Analysis and results

Ordet er dit (The word is yours)

Ordet er dit. Fokus på mundtlighed i 5.-6. klasse is an analog didactic learning resource, which goes into the oral texts of L1, and the students are introduced to tools for analysis in the work with oral texts. The teacher's book consists of a short walk-through of the theoretic framework of the material, as well as chapter-by-chapter instruction and complementary worksheets.

The student's book is split into the following chapters: Read and Listen, Life Story, Reading Aloud, Conversation and Debate, and Oral Presentation. Extra material such as sound-clips and films can be found on the publisher's website. The material is organized on the basis of the national curriculum for L1 teaching (UVM, 2019) and poses concrete goals for each chapter, and every chapter includes response and assessment. In the following, the first chapter of the student's book is analysed.

"Speak and listen"

The first part of the chapter is about the use of breathing, voice, and body language, and the students are introduced to different techniques for this. The second part is about listening, introducing an oft-overlooked part of L1. Therefore, it will be interesting to look at how listening is treated as academic content in the learning material.

Listening is a part of the preliminary learning goals of the chapter and is articulated as "listening actively". However, it is not further explained how active listening is to be understood. Under the headline "Fold out your ears", listening is briefly treated. "To hear" and "to listen" are distinguished. Hearing is one of the five senses, and is defined as registering sound, thus a physiological phenomenon. Listening, on the other hand, requires activity: "When you listen, you have to actively do something", but it is not further explained what "something active" is. In turn, it is emphasized that listening is a skill that has to be trained, because it "can help make it easier for you to learn" (p.16).

The first task (a) is called "Finding mistakes". In the introduction, it is pointed out that it "can be of help to know what you are listening for. This is called listening with intent." (p. 16). The task is to listen and find mistakes in a reading (e.g. grammatical mistakes, wrong words or names). Hereafter, the students

have to talk about the task, whether they found it easy or hard to find the mistakes, and whether they listened differently than usual.

In the teacher's book, the notes for the chapter say that "as the teacher, you can support the students' listening every time you work with orality", and that it is important to create space, a framework, and rules for listening (p. 19). Neither the teacher's nor the student's book has much guidance to help achieve this. In the task, the student is not introduced to listening purposes, or to academic listening strategies. In the teacher's book, it says that the students need to know multiple ways of listening, e.g. listening for information, listening critically, listening with empathy, and listening with their whole body. It is hard to say how a task such as listening for mistakes in a fictional text is supposed to prepare the students for this, and the discipline itself is not presented further in the material.

In task (c), "Talk about your day", the students have to listen with disinterest to the everyday story of the speaker. In the teacher's book, it says that listening is a cognitive process ("just like reading") (p. 19). However, this task also focuses on the sociocultural, interpersonal perspective, and the purpose of the task is to make the students aware of their role as listeners considering body, gesticulations, looks, response, etc., but this purpose is not stated clearly. The task is rounded off in an informal conversation between the students, where they discuss how to capture the attention of listeners, and how they listen with disinterest.

The students are not presented to the differences between the two listening acts in task (a) and (b) (listening to a reading – fiction – and listening to an everyday story), and academic terms such as, for example, listening acts or listening strategies are not used. The students are not explicitly introduced to listening strategies, whether cognitive or interactional. There is a sizable difference in the use of listening strategies depending on whether they are listening to a reading or an academic lecture, and their responses are different, depending on whether they are listening to a one-way communication, e.g. a lecture, or a predominantly interactive relation, e.g. a class discussion or group activities.

In task (d), "Talk about good advice for listening", the students have to give advice concerning listening, and the task is concluded in four general pieces of advice (p.18). The advice covers a mix of cognitive and interactive processes, e.g. listening advice no.1, where the students have to listen attentively (a cognitive process) and simultaneously look at the speaker (an interactive process). Moreover, both are dependent on the listening act and purpose themselves.

The chapter ends with an assessment, which does not directly concern listening, but has a point called: "Why is it important to be good at listening?". The students are not assessed on their knowledge of listening purposes or listening strategies, etc.

Listening as an academic discipline is only covered shallowly in the rest of the material. The students have to listen to different things, e.g. readings, life stories, presentations, or other people's arguments, and through the remaining sections of the student's book they are reminded to remember the pieces of advice for listening, but there is no differentiation in relation to the academic subject matter and the purpose of listening. The teacher's book says that the students have to learn to listen in different ways, e.g. listening for information or listening critically, but these are not skills that are explicitly taught.

Characterizing the learning resource

The material comes across as an independent course on orality. The risk is that students and teachers will not integrate this into daily L1, even though the explicit purpose of the material is to "show how this [the oral dimension] can be prioritized in daily L1." Orality is at a risk of becoming an appendix to the "real" L1. The teaching of orality is often separate from an academic context and content, as a great deal of the material is independent from L1.

Tina Høegh points out: "Orality education cannot only be about learning to *say something*, but rather it has to be about the content, about which the students are talking. A one-sided prioritization of teaching the students to *express an opinion* (learning to speak) over the *dimension of content* (what you are talking about), can block the students' awareness of the strength of the very qualification of their own arguments in a class dialogue" (Høegh 2018: 210, our translation)

In terms of content, the material involves the traditional academic disciplines of L1, e.g. reading aloud, stories, argumentation, and presentation. A single chapter involves predominantly forms of dialogue, i.e. conversation and debate. However, this is only covered on a superficial and recognizable level, e.g. how to agree on the menu for a camping trip, or how to construct an argument. More critical and investigative forms of dialogue are not presented. Based on the triangle of orality, the individual chapters of the material include the different levels of the triangle, both globally and locally. However, they are not tied together in an integrated didactic of orality.

Danskfaget.dk

danskfaget.dk for middle school (4th-6th grade) is described as "A complete, digital learning resource for L1 in middle school". The portal is built around five points in the main menu: "Courses", "Subjects", "Activities", "Assignments", and "Resources". L1 is characterized as a communication-subject: "L1 is largely a communication subject. At Danskfaget, we work with the extended textual concept, which covers all types of communication. The students need to experience text as a communication, and that every communication has a sender and a receiver" (danskfaget.dk, our translation).

The contents of the portal are written by multiple authors. For the same reason, it is important to stress that analysis, characterisation, and assessment solely concerns the mentioned examples and targeted sections of the learning resource. A large number of the activities and units demands use of the oral language, which the students have to talk about, discuss, present, and listen to. The learning resource contains interesting examples of integration of requests from newer research projects, e.g. integrate body and voice as an approach to the literary analysis (Høegh, 2017). However, this is often not made an explicit part of the education. Meaning the resources teach *with* orality. None of the 75 courses explicitly focus on teaching the students orality or listening.

However, seven themes can be found under "Subjects": "Reading", "Writing", "Use of language", "The languages of the North", "Text types", "Literary reading", and "Orality". Under "Orality", the "Introduction" is fairly short, and only concerns the difference between the spoken language and the written word, and five additional themes. The themes, "Lecture", "Reading aloud", and "The good speech" are all examples of education focused on the oral performance of a text, based on a rhetoric tradition and with extra focus on the local levels of the triangle of orality. In all three instances, the student decides the subject and/or text.

The theme "Debate" is interesting to dive into, mainly because our preliminary studies show that the learning resources often support the teacher in teaching presentations, but rarely conversation. In the overall study, we have seen no examples of support of, for example. class discussion, despite this being emphasized by research as being especially relevant – both concerning the development of the students' ability to participate in democratic processes (Høegh, 2018; Reznitskaya, 2012; Haugsted, 1999), and concerning class discussion as a basis for students' learning process (Dysthe, 2002).

The "Debate" theme is written by Ditte Christiane Jensen (2019) and has the following opening: "You have probably heard of political debates in connection to a General Election or a Municipal Election. A debate is a form of discussion between different people, who disagree on something" (Jensen, 2019, our translation). On one hand, the wording is an invitation to use the students' own world of experience as a starting point. On the other hand, though, it can seem almost excluding to the student who has never "heard" political debates. There is a difference between having heard *of* a political debate, and having heard a political debate, and the wording seems like a weak classification and framing (Chouliaraki & Bayer, 2001) – a kind of implicit modelling text.

The students have to make a panel debate based on a self-selected subject. This is done by 1. "Read an article on the subject. (dr.dk)", and 2. "Figure out what the article thinks of the present subject, which is being debated". Hereafter, the students have to talk about their views of the subject, and in groups of

four pick two students who are pro a certain view and two who oppose it. The debate is carried out, while the rest of the students ask questions and discuss the content of the presentations.

It is debatable whether this is actually an example of teaching the students orality. Are the students shown how to debate? The assignment formulation only concerns the global layer of the triangle of orality, and even then only on a general level. The genre is given, the students have to carry out a "panel discussion", but the communicative situation is not further identified. What is the purpose of the debate? Who are the students supposed to convince, and in which imaginary context? And, not least, how is this done?

There is no model text, and the students are only supported through a set of "ground rules". The approach is described as "1. A person or party present an opinion", "2. Other people or parties oppose the opinion. They have another opinion", and "3. Both parties argue their opinion" – together with an urging to "give the opposing party a chance to speak without interruption". There is no guidance as to how phrasing, body language, gestures, and mimicry can support the debater. The free choice of subject can seem motivating, but it makes it hard to educate the students in the relevant semantic network and to build a relevant vocabulary, both words and concepts, in relation to the subject, and which are characteristic of the genre.

In continuation of the proclaimed view of L1 as a communication subject and the emphasis on authentic communication, it might have been expected that the students had to debate a subject in front of a real audience, either within or outside school. This could have been a debate on school matters, or an important subject in local life.

All "Subjects" are presented as individual activities that can often be carried out in 90 minutes. It is up to the teacher to integrate this with the remaining L1 education. The challenge is that the themes risk becoming an instrumentalisation of the subject – the students are being taught a certain way that is not related to L1-related subject matter (cf. Høegh, 2018:210). The question poses itself: to what extent is the learning resource actually "a complete, digital learning resource for L1 in middle school"?

Conclusion

In the Danish curriculum (UVM, 2019), orality is included in the course "Communication", which includes using both the linguistic and nonlinguistic communicative resources available to the students, in order to create meaning from different situations. It is an important point of our project that working with the different communication resources of orality should happen as an integrated mutual reaction, so that the education does not consist of detached sequences.

Simultaneously, it is an important point that L1 has a focus on academic content relevant for L1, so that the focus is not only on "saying something", but also "what are we saying" (Høegh, 2018, our translation).

This means that if we are to offer the students relevant ways of using the oral language, we have to secure not only situations in which the students can choose between different ways to create meaning with verbal language, but also that these situations are relevant to L1.

Both of the analysed learning resources have a focus on form, and highlight the traditional, rhetoric-inspired oral areas of L1, e.g. reading aloud, telling a story and presentation. Based on more recent research in orality, one could wish for learning resources that focus on class discussion, as well as more critical, investigative dialogue. Teachers and students are offered no tools to participate in more explorative and critical forms of dialogue.

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The recent Brazilian academic production about physics textbooks in national journals

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Abstract

The textbooks have a significant presence in the classrooms of public basic education in Brazil, especially after the universalization of its access through the Brazilian National Program of Textbooks – PNLD. The massive presence of textbooks in classrooms and the large investment made by the Federal Government to acquire and distribute these didactic materials both justify the investigation regarding its presence in the school's environment, investigations that have been present since the 1980s. However, despite this presence, they have been shown in smaller numbers when compared to other themes in Education. Aiming to quantify and categorize these researches, the goal of this work was to perform a survey of the recent Brazilian academic productions regarding Physics textbooks. In order to do that, searches were performed in highly graded Brazilian journals, in which publications were on Science Education and Physics Teaching that were available online. Looking for elements that related the researches to Physics textbooks in the paper's title, it was identified 65 published papers in the period between 2009 and 2017. After reading the abstracts and checking if they agreed with the object of study, 15 of the 65 papers were selected for a deeper analysis. From this analysis, it was established eight categories that allowed to classify possible lines of research on Physics textbooks: Constitution of the textbook, Environmental Education, Experimentation, Science History, Paradidactic books, Problem Solving, Imaging Representations and Didactic Transposal. The gathered results also showed that the frequency of published papers is very low, approximately 0.6% of the themes published in the studied period, indicating little investigative expressivity regarding textbooks, even though it is an important

element of the teaching-learning process and the public investment in the evaluation, purchase and distribution of these books.

Keywords

Introduction

Textbooks are present in most parts of Brazilian public schools. It is a familiar object of the school culture that is hard to define. Escolano (2012) defines the textbook as a specific class of text that materializes in print or digital form, with its own characteristics, which is presented as a pedagogical support, being recognized by the subjects who use it and by the society in which it circulates as an object. In Brazil, the textbook is an important instrument in the formal teaching-learning process, as an expression of its role in the constitution of the "disciplinary code" (Cuesta Fernández 1997), according to which it contributes to the development of certain contents and teaching strategies, meaningfully marking what is taught and how it is taught.

Textbooks have been part of the Brazilian educational context since the imperial period. According to Zacheu and Castro (2015), there are records of textbook use as early as 1820, when the first public schools in Brazil were created. However, one of the first official concerns regarding textbooks occurred in 1930 with the creation of the National Book Institute (INL), a public agency that had the function of expanding the didactic production in the country (Frison, Vianna, Chaves, & Bernardi, 2009). It was followed by several other actions to provide access to textbooks for Brazilian students and teachers.

In 1967, the National School Materials Foundation (Fename) was created, responsible for producing and distributing educational materials throughout the country at affordable prices. In 1971, INL created the National Program of Textbooks for Elementary School (Plifed). INL was extinguished in 1976 and Fename took over part of its functions, becoming responsible for the distribution and coordination of the production of textbooks. In 1983, Fename was incorporated into the Student Assistance Foundation (FAE), which resumed the administration of Plifed, which, through Decree No. 91.542 of August 1985, gave rise to the National Program of Textbooks (PNLD), which has become, in terms of quantities and resources involved, one of the largest textbooks evaluation and distribution programs for public school students and teachers.

Currently, the textbooks approved in the PNLD notice are distributed to all students and teachers of public schools in the country, demanding a high investment from the federal government, which in 2018

was about 1.1 billion reais (EUR 250 million) in the evaluation, acquisition and distribution of these books.

Then, it is possible to realize that the textbook, besides being a learning instrument that is part of the history of education in the country, has wide coverage in the Brazilian educational system. Considering its magnitude due to the public policies that ensured its universalization to basic public education, it is natural that educational research regarding this theme increases (Leite, Garcia, & Rocha, 2017) and diversifies.

Thus, in order to be able to follow research trends, it is necessary that reviews on the themes investigated in the area are conducted more frequently, which justifies the present investigation, which sought to evaluate some aspects of the Brazilian scientific production regarding Physics textbooks and aimed to present a characterization of this recent production about these books, in terms of research themes, as well as results obtained in the scope of these investigations.

Context/Problem

The initial research on Sciences textbooks, according to Ferreira and Salles (2003), was based on reference sciences and focused their attention on the conceptual errors of teaching contents, disregarding the particularities of the school knowledge. However, since 2004, when PNLD began to distribute freely and in a progressive matter textbooks for teachers and students of basic education, there was a change in this investigative landscape, with significant increase in the number of researches on this object of school culture.

The spectrum of educational research has also widened, no longer focusing on conceptual correction. According to Leite et al. (2017), research began to concern itself, in addition to content, with language, methodology, public policies and their relations, among others.

Methodology

In order to better interpret how the research on Physics textbooks has been developed in Brazil, a survey of academic productions on this subject was conducted. To this end, it was consulted a set of eight national scientific journals, which make their publications available for free on internet websites, searching for papers that address the topic of Physics textbooks.

The construction of the sample of papers included the journals that deal with Science Education and Physics Teaching. The criteria used to select the journals was their classification in Qualis CAPES[22] (Higher Education Personnel Improvement Coordination), selecting the journals classified as A1 and A2. It was noticed that, after analysis, some journals did not present articles related to the theme of textbooks and were, therefore, excluded, resulting in six journals analyzed. The list of journals selected for analysis is displayed in Table 01

Table 01: Scientific Journals Investigated

No	Journal	Qualis CAPES
1	Caderno Brasileiro de Ensino de Física	A2
2	Ciência & Educação	A1
3	Ensaio Pesquisa em Educação em Ciências Investigações	A1
4	Investigações em Ensino de Ciências	A2
5	Revista Brasileira de Ensino de Física Revista	A1
6	Revista Brasileira de Pesquisa em Educação em Ciências	A2

Source: The authors.

After the selection of the journals, the papers that presented in their titles terms that referred to textbooks were identified. The papers published in the period from 2009 to 2017 were selected. This time frame was chosen because the insertion of Physics textbooks int the purchase and distribution programs by the Federal Government occurred only from 2009.

In this first stage, 65 papers were found, whose abstracts were read in order to select only those that presented the textbook as a research focus. After tis preliminary reading, 50 papers were excluded, leaving 16 papers that met the conditions of the investigation.

Table 02 displays the percentage of publications on Physics textbooks (LDF) in relation to the total number of papers published in the analyzed period.

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[22] Qualis is a set of procedures performed by CAPES to stratify the quality of intellectual production, assessing the quality of articles and other types of production, based on the analysis of scientific journals. The strata considered of highest quality are strata A1 and A2.

Table 02: Number of papers analyzed in relation to the total number of papers published in the period 2009-2017

Journal analyzed	Quantity of papers		
Title	Total number of papers available	Papers analyzed	
		Number of papers	% of total number
Caderno Brasileiro de Ensino de Física	331	04	1.20
Ciência & Educação	325	02	0.61
Ensaio Pesquisa em Educação em Ciências	675	01	0.14
Investigação em Ensino de Ciências	252	01	0.39
Revista Brasileira de Ensino de Física	766	07	0.91
Revista Brasileira de Pesquisa em Educação em Ciências	193	01	0.51
Total	2542	16	0.62

Source: The authors.

Then, a rigorous reading of the abstract and the complete selected papers was performed, aiming to identify the analyzed journal, year of publication, research focus and research results.

Gibbs (2009) coding and thematic categorization was used to analyze the information of the papers, which consists of a model of indexation or categorization of the text in order to establish a thematic idea structure.

For the characterization of the selected papers it was used open coding, according to which, from reading the text, data are extracted that enable the formulation of theoretical or analytical codes that allow the construction of a thematic categorization.

From this coding criteria eight thematic groups were organized according to which the lines of research in Physics textbooks were presented: Environmental Education (EA), Textbook Constitution (CLD), Problem Solving (RP), Experimentation (EP), Didactic Transposition (TD), History of Science (HC)[23], Imaging Representations (RI) and Paradidatic Books (LP).

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[23] In the investigation there were no articles related to the HC - History of Science category.

Results

The theme Environmental Education was found in the paper "Educação Ambiental e educação em valores em livros didáticos de Ciências Naturais", written by Bonotto and Semprebone (2010). The authors analyzed how the environmental theme is approached in the textbooks of the early grades of Elementary School, and the appreciation of the view of the usefulness of nature for men and scientific knowledge. According to them, only one of the collections analyzed addressed the theme with less utilitarian view of nature.

In the thematic group Textbook Constitution, two papers were found: "Os três momentos pedagógicos e o contexto de produção do livro de Física" by Muenchen and Delizoicov (2014), and "Livros didáticos baseados em apostilas: como surgiram e por que foram amplamente adotados", by Chiquetto and Krapas (2012). In the first paper it is discussed how the proposal of the three pedagogical moments, which is divided into introducing the student's daily life, contextualization of the contents and organization of the Physics program through central themes instead of compartmentalized structure, changed the approach of the contents in the Physics books. The second paper investigates how the Physics textbooks based on preparatory handouts were accepted by the teachers. The justification presented showed that the wide acceptance was due to the ease of working with these materials with large number of students and that the books were easy for any teacher to use, as many were not Physics graduates.

Regarding Problem Solving, two papers were found. In "Questionamento em manuais escolares: um estudo no âmbito das Ciências Naturais" by Torres, Almeida, and Vasconcelos (2015), it is discussed the level of exercises present in Natural Sciences textbooks and their contribution to the learning of students. Authored by Chiquetto and Krapas (2012), the other paper "Examinando exames: análise dos vestibulares que nortearam o livro "Fundamentos da Física", analyzed the entrance exams of engineering schools in the state of São Paulo prior to 1975. Because this book was designed to prepare students for these entrance exams, whose questions were quantitative and of high difficulty, due the need to select a few students from a large number of candidates, the authors concluded that their intensive use contributed to that Physics should be stigmatized as an excessively mathematized subject.

The thematic group Experimentation was constituted by the paper: "O Enredo da experimentação no livro didático: construção de conhecimentos ou reprodução de teorias e verdades científicas?", written by Güllich and Silva (2013). In this paper, the authors investigated how Science textbooks present experimental models to be developed in class, which was done by analyzing ten textbooks cataloged in the Dourados Public Schools Book Bank, a city in the state of Mato Grosso do Sul. After the analysis, the authors stated that the books convey a simplistic view of science, by the understanding that experimentation is a set of procedures to be followed in order to prove the theory. In this sense, such

books reinforce the view that the function of experimentation is to confirm and reproduce established theories. Güllich and Silva conclude that an in-depth discussion is needed on the conceptions of science and experimentation present in textbooks initial and concluding education programs.

For the theme related to Didactic Transposition eight papers were used: "Física moderna no Ensino Médio: com a palavra os autores dos livros didáticos do PNLEM" (Dominguini, 2012), "Analysis of grade six textbook on electricity through content analysis and student writing responses" (Qadeer, 2013), "Herch Moyses Nussenzveig e a ótica quântica: consolidando disciplinas através de escolas de verão e livros-texto" (Silva Neto & Freire Junior, 2013), "Consequências das descontextualizações em um livro didático: uma análise do tema radioatividade"(Cordeiro & Peduzzi, 2013), "A teoria da relatividade restrita e os livros didáticos do Ensino Médio: discordâncias sobre o conceito de massa" (Jardim, Otoya, & Oliveira, 2015), "Analogias e metáforas nos livros didáticos de física" (Sousa Silva & Martins, 2010), "Livros didáticos: Maxwell e a transposição didática da luz como onda eletromagnética" (Krapas, 2011), "Organização praxeológica de saberes escolares: uma comparação da equação de Clapeyron em livros de Física e Química" (Zanardi, Kneubil, & Pereira, 2013). These papers have in common discussions about didactic transposition, and most of them deal with contents related to Modern Physics.

The thematic group Imaging Representation was built from the reading of the paper, "Abordagens imagético-verbais relacionadas à balança elétrica de Coulomb em livros didáticos de Física", by Silva and Monteiro (2015), which discussed how imaging-verbal representation contribute to the understanding of Coulomb's torsion balance, concluding that the representations do not yield understanding of the concept of this experimental apparatus.

Finally, the Paradidatic Books category was constituted by the paper "O livro paradidático no ensino de Física – uma análise fabular, científica e metafórica da obra", by Souza and Neves (2016). The paper presents how the work Alice in the Quantumland can be used by High School teachers as an alternative to teaching modern Physics. The authors conclude that paradidatic books can be used as a supporting material for the textbook.

Table 3 summarizes some of the data from the selected papers.

Table 03: Thematic classification of selected Papers

Journal analyzed	Number of papers found by theme group						
Title	EA	CLD	RP	EP	TD	RI	LP
Caderno Brasileiro de Ensino de Física	00	00	01	00	01	01	01
Ciência & Educação	01	01	00	00	00	00	00
Ensaio Pesquisa em Educação em Ciências	00	00	00	01	00	00	00
Investigação em Ensino de Ciências	00	00	00	00	01	00	00
Revista Brasileira de Ensino de Física	00	01	00	00	06	00	00
Revista Brasileira de Pesquisa em Educação e Ciências	00	00	01	00	00	00	00
Total	01	02	02	01	08	01	01

Source: The authors.

Discussion

The results allowed to elaborate an overview of what is being investigated about Physics textbooks in the areas of Education and Physics Teaching.

Despite the spectrum covered by the categories, most of the research identified referred to didactic transposition, and those that addressed, for example, aspects related to the History of Science were not found, despite the indications of the PNLD notice, allowing to infer that these researches are still closely linked to school knowledge, not transcending other themes.

It was also possible to notice that, despite the relevance of the textbook in Brazil, research on this subject is very limited, considering that it does not reach 1% of the total publications in the best rated journals, allowing us to conclude that there is still little academic production about textbooks, despite all the investment made by the federal government in the evaluation, purchase and distribution of these books.

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Guide manuals for teachers: teaching physics knowledge in the early years of elementary school

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Abstract

This paper reports a research that aimed to analyze manuals of General Didactics and Didactics and Methodology of Science Teaching produced in Brazil with the purpose of guiding teachers to teach the Physics knowledge in the early years of Elementary School. The manuals were produced to initial and continuing teacher training and they can contribute to the understanding of teaching and learning present in the Brazilian school culture, in different historical periods. The research problem is related to the need to analyze how the teaching of Physics knowledge is proposed in manuals intended for teachers. The documentary *corpus* are textbooks available in the book collection of the Research Center on Didactic Publications of the Federal University of Paraná (NPPD/UFPR), which were inventoried, identified and cataloged in an exploratory phase of the empirical work. In this paper, the ones selected were those that present teaching guidelines to teach Physics knowledge, published after the production of the National Curricular Parameters (PCNs) as part of the educational reform that occurred in the 1990s. Methodologically, the data were produced through the analysis of the content of the manuals, using categories of didactic nature such as objectives, contents and procedures to teach Physics knowledge. The results evidenced the presence, in the manuals, of elements that indicate the processes of construction of a Didactics of Physics over the last decades.

Introduction

Textbooks are an important part of school culture and, as such, are relevant sources for the study of different aspects of schooling, as well as of the relationships that societies establish with books and reading more broadly. In Brazil, textbooks also play a relevant role outside the school limits, as shown by

the results of research on reading in Brazil, carried out systematically over the last decade by the *Instituto Pró-Livro* (Failla, 2016). Research indicates that between 60% and 70% of those interviewed have the textbook as their first genre of reading, followed by the Bible, which explains the relevance of taking this artifact of school culture as the focus of this research.

The access of Brazilian students to textbooks is mainly through the National Textbook Program (PNLD), which distributes textbooks to Elementary and High Schools, collections of literary books, complementary books and dictionaries. The program, created by the federal government in the 1980s, aims to support the pedagogical work of teachers.

Besides the PNLD, the Ministry of Education has maintained other programs related to school books since 1997, such as the National School Library Program (PNBE), "whose purpose is to promote access to culture and encourage reading in students and teachers through the distribution of collections of literature, research and reference books" (http://portal.mec.gov.br/programa-nacional-biblioteca-da-escola). A specific action of this program, called "the Teacher's PNBE", seeks to "acquire relevant literature to help regular basic education, and youth and adult education teachers in preparing teaching plans and expanding classroom activities with students". (http://portal.mec.gov.br/programa-nacional-biblioteca-da-escola/acervo-do-professor).

Among these books, there is a specific type that has been studied in this research. These are books intended to guide teaching and are called Teaching Manuals, Teaching Methodology Manuals, Teaching Practice Manuals, among others. These manuals have a long existence in Brazilian school culture and are related to initial and continuing teacher training, and are produced with the intention of contributing to the organization of teaching in different school subjects.

Among these teacher training manuals are the Science Teaching Methodology and Physics Manuals, for teachers of different levels of education, which were the subject of this research.

Contextualization: Guide manuals for teachers as a diverse set to be studied

Teacher's Manuals have been produced in Brazil since the second decade of the 20th century, and they include a diversity of books with different characteristics. Nagle (2009) used the name "pedagogical literature" to define such books that fulfil the main purpose of addressing teachers in training, especially for those called, until 1970, "normalist teachers", who worked in Primary Schooling.

Throughout the 20th century this literature was reconfigured due to the transformations that occurred in the educational system and in teacher training. Other denominations were used to identify these books, as Silva (2005) did when he used the expression "Pedagogical Manuals" to denominate books that present

both fundamentals of education (e.g. those of Philosophy of Education) and those that present teaching methods (e.g. those of Didactics).

Therefore, among the teaching manuals, there are some aimed at teaching to teach certain school subjects. According to Bufrem, Schmidt, & Garcia (2006), these are that books not propose to present the content of a subject - as it happens with the student's textbook - but rather propose to guide teaching. They are the General Didactic or Specific Didactic textbooks, intended for teachers. The analysis of these textbooks allows us to understand the movement through which certain methods of teaching have been consolidated over time and also allows us to trace the trajectory of the contents to be taught, in each school subject. Thus, "visible elements of the disciplinary code" (Cuesta Fernandez, 1998) of these subjects are considered to structure the field of General Didactics and Specific Didactics.

The bibliographic review carried out indicated that the first studies focused on these specific teaching manuals in Brazil were developed by Alcione Carvalho (1999), who studied the Geography Teaching Methodology manuals; and Schmidt (2005), who analyzed the History Teaching Methodology manuals. But this subject is still little studied by educational research.

When analyzing the manuals focused on History teacher training, Urban (2009) emphasizes that the way teaching and learning are understood reflects the context and time in which the manual was produced; in the case studied by her, the tendencies to standardize History teaching remain strongly linked to Psychology and Pedagogy, and the manuals maintain the idea of guiding the teacher from these areas of knowledge, rather than from historical science.

For Rodrigues (2010, 2015), who also reviewed History teaching manuals, these textbooks were designed to propose teaching methods and reflections on teaching and learning processes, in order to establish themselves as texts of a specific didactic. In his research, the author also emphasized the influence of constructivist and socio-interactionist perspectives, noting an increase in the number of publications of textbooks on History Didactics in the last decade.

As for Physics, in a research carried out on the General and Specific Didactics manuals, Garcia, Nascimento & Scomação (2015) emphasize that Physics is a necessary and useful knowledge for the development of students since the first Didactics manuals of the 20th century. For the authors, the research carried out allowed, among other elements, "to understand how the general ideas of teaching, addressed in General Didactics, influence the presence of certain contents and methods in Specific Didactics, in this case, Science and Physics" (Garcia, Nascimento & Scomacao, 2015, p.7).

The importance of studying textbooks for teachers is highlighted due to the potential of the research to clarify certain elements related to teacher training, which are expressed by the authors of the textbooks. Through them, it is possible to understand the value attributed to the contents, as well as the movements

towards certain teaching and learning concepts that are found in the suggestions on how to teach the specific subjects.

The manuals - understood from what the word means - seem to keep this role over time: placing in the hands of the teachers, in a precise way, the elements that guarantee the success of their work. It is important to point out that in the specific case of Physics, the textbooks have great relevance because they provide guidance to teachers of the early grades (who do not have the specific training in that school subject) on how to incorporate such complex, but at the same time so important, content into the education of children.

Methodological procedures

The general aim is to understand the didactic and methodologic guidelines presented in the manuals intended for teacher education, contributing for the comprehension of how the Physics Didactics has been developed over the last century in Brazil. The specific objectives are: to find manuals that were produced throughout the twentieth century to guide teachers in teaching Physics knowledge; to categorize the different types of manuals found; to analyze contents and procedures suggested in the manuals to guide teaching in the early grades.

The research is part of a wider project intended to form a physical collection of this type of work and the production of a virtual base, allowing access to the data produced in the project and stimulating studies with different focuses. The manuals were separated by area of knowledge and school subjects, composing a collection that, at the moment, includes about 250 works, both in General Didactics and Specific Didactics, a number that changes as new titles are located or produced.

In this paper, we are presenting one of the researches carried out. The first stage was to identify the manuals of General Didactics and Natural Science Didactics which circulate in the country, constituting a physical collection at the Centre for Research on Didactic Publications (NPPD/UFPR). The research was made in libraries, bookstores, second-hand bookstores. Donations were also received from personal collections and 33 manuals were found.

The second stage comprised the previous reading of all manuals identified in the first stage and the definition of a temporal cutout to carry out the study, establishing the documentary *corpus* to be analyzed. With the support of the content analysis procedures (Franco, 2003), the manuals that presented suggestions for the teaching of Physics knowledge in the initial grades of Elementary School were selected for prior reading. Learning that this had been happening since the first works published at the beginning of the century, it was determined that this research should be situated in the area of discussion between General Didactics and Specific Didactics.

Manuals released from 1990's on were chosen, since the Federal Government promoted education reforms at that time, in which the National Curricular Parameters (PCNs) were established to guide the whole school system in the elaboration of their projects and teaching programs, constituting a mandatory reference to the publication of school books.

Thus, the third stage was the analysis of the content of five manuals. From the survey performed, manuals were selected for the second level of analysis, using the following criteria: manuals intended especially for the early grades of Elementary School (or primary school); that suggest teachers how to teach Physics knowledge, including teaching topics and strategies or procedures, which were produced in the context of elaboration and implementation of the PCNs, in the educational reforms that took place in the 1990s.

The results were organized under didactic categories, previously defined for the documentary analysis: contents proposed by the authors and methodological procedures suggested by the authors.

Guidelines for teaching Physics in the early years of school: what the textbooks say about teaching contents and procedures

In this text, only part of the results of the analysis of the content of five works selected from the defined criteria will be presented: "Ciências no ensino fundamental: o conhecimento físico", by Anna Maria Pessoa de Carvalho and collaborators (1998); "Ciências: fácil ou difícil?", by Nélio Bizzo (2007); "Ciências e Didática", by Simone Selbach and collaborators (2010); "Ciências. Soluções para dez desafios do professor", by Rogério Nigro (2011); and " O ensino de Física para crianças de 3 a 8 anos: uma abordagem construtivista", by Devries & Sales (2013).

Two categories of analysis were established based on didactic elements: a) **Suggested contents** for teaching Physics knowledge in the early grades or suggested topics; b**) Teaching procedures and strategies** suggested in the guidelines for teachers.

Two manuals, among the five analyzed, were specifically designed to guide Physics teaching in the early grades, so the location of contents/subjects was done in a direct and explicit way. In the other manuals, the contents related to Physics are also suggested, but as an insertion in the Science knowledge.

Regarding the contents

The analysis of the manuals showed that the content with the greatest indication is Movement, which is shown in three out of five manuals. It should be noted the theme is also emphasized in other phases of schooling; despite the debates about its role and relevance to other potentially more significant content in Physics, the content is valued both in teaching programs and in textbooks. Other themes are less suggested: Water, Balance, Energy Conservation, Heat, Weather, Sound, Optics and Astronomy.

Two manuals suggested the contents on Air, Light and Shadow; it was found that such themes are already present in manuals from the last century, such as in João Toledo's (1930) "Didactica" manual, which relies on the intuitive teaching method to suggest that the contents are close to the students' lives and that the teacher stimulates the observation of phenomena. Thus, the permanence of this theme overtime is stressed.

Two manuals, among the five analyzed, were specifically designed to guide physical knowledge in the early years. Therefore, in these manuals the contents and themes were explicitly located. In the other three manuals, the contents related to physical knowledge are also suggested, but as an element inserted in the knowledge of Natural Sciences.

Regarding teaching procedures and strategies

In terms of teaching procedures, all the manuals reviewed are similar in their recommendations and suggestions. Experimentation, observation and discussion are seen as strategies that teachers should use in the classroom. Some of these guidelines for the early grades have been found in General Didactics textbooks since 1930.

Although apparently similar, the meaning of the suggestions should be considered at each historical moment. This aspect is highlighted in one of the publications and it contributes to clarify the differences. Ana Maria de Carvalho et al. (1998) say the experimental work in Science is unquestionable and should be a priority in teaching, mentioning that in the past, experiments only served to present the phenomena

to the students, but later the didactic laboratory was used as a place where the students would rediscover their whole knowledge.

However, for these authors, in a constructivist perspective it is not expected that students discover new knowledge through practicing, because the main purpose of experimentation is, "with the help of the teacher and from previous hypotheses and knowledge, to expand the students' knowledge about natural phenomena and make them relate to their way of seeing the world" (Ana Maria de Carvalho et al., 1998, p. 20). Similar concerns were also found in the other works analyzed, showing the predominance of the mediating role that the teacher assumes in the socio-interactionist conceptions of learning.

In summary, both in the official curriculum guidance documents and in the textbooks, it is possible to recognize indications that announce the constitution of Didactics of Physics, through the proposition of Physics knowledge that should be the object of teaching for the early grades of Elementary School. In addition, there is also consensus on the most appropriate ways to teach Physics knowledge at this level of schooling.

Final Considerations

Throughout the century, the teaching of Physics knowledge was suggested to teachers of early grades in different teaching manuals, with different degrees of detail.

The manuals analyzed do not have a single structure but have the same objective: to guide the teaching of Physics knowledge as a set of subjects and themes that have specificities to be considered by Natural Science teachers. There are manuals that present reflections on aspects of teaching and learning; others that intersperse reflections and suggestions. There are also works that select a theme and theoretically explore the possibilities of work, or even propose classroom activities for the development of that theme. There are contents and procedures that have remained over the years, such as the suggestion to use observation. However, there are themes that were only suggested in the end of the twentieth century, such as Energy.

From the elements found in the manuals, it can be stated that Physics Didactics has been built over the last century; which is expressed in the manuals and the transformations verified by the research. An indication of this process is the recent publication (2014) of a book called Didactics of Physics (Nardi & Castiblanco, 2014), with a different title from other works called Methodology for Teaching Science or Physics. Although the book is not intended for early grades, its existence and characteristics may allow us to reflect on two points.

The first refers to the fact that the manual "presents a theoretical structure associated with suggestions for practical activities that relate objectives, contents and teaching methodologies, in order to ensure

consistency between what is said and what is done in the classroom," in the words of the authors themselves (2014, p. 7). Here we have the idea of a set of guidelines articulated around foundations and didactic elements - therefore it is a didactic manual, in the strict sense of the expression, as defended by Garcia (2014).

The second point is that, besides the works of Didactics of Science, we can now find a work on the Didactics of Physics. This can be taken as an indication that the manuals analyzed were slowly making way for Physics in the initial grades, with contents and procedures specifically indicated by the authors; and that this process is related to the constitution of what Nardi and Castiblanco (2014) call the "Didactics of Physics", suggesting a new discipline for teacher training.

An exploratory study in teacher training courses at federal universities in southern Brazil (Pedagogy and Physics Graduation) showed that the expression "Didactics of Physics" is not yet used to identify subjects related to science teaching in the curricula of the courses. Subjects such as General Didactics, Teaching Methodology, Teaching Practice and Didactic Transposition of Physics Topics are mentioned.

The teaching manuals, from a theoretical perspective, bring out aspects of the construction of such subject, confirming the conceptualization as a recognizable part of the disciplinary code, a term used by Cuesta Fernandez (1998) and which served as reference to other research produced in the NPPD/UFPR. Finally, the importance of taking teacher's manuals as an object of research is reaffirmed, given their potential to clarify elements related to teacher training, the value attributed to content, as well as the presence of certain teaching and learning concepts that are revealed in the suggestions on how to teach, in this case particularly Science and Physics.

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The relationship between textbooks and other resources. Digital educational objects suggested in the PNLD Physics textbooks.

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Abstract

The theme of the research is the relationship between textbooks and other teaching resources. It used as a reference the current debates regarding the possibilities of Information and Communication Technologies (ICT) making teaching more interesting and meaningful, considering that devices such as cell phones and computers are present in the daily life of schools and young students, including in low-income populations. Physics textbooks have added suggestions for the use of other digital materials, partially due to the requirements of the official evaluations and partially as a result of the new technologies available in social life. The objective of the research is to analyze the proposition of suggestions for the use of simulators by the authors of the Physics textbooks approved by the National Textbook Program (PNLD) and in use in Brazilian schools. After a general analysis of each textbook, units related to Modern Physics were analyzed in four selected textbooks. Due to such results, questionnaires and interviews were carried out to understand the point of view of the students. The analyses showed that the books present suggestions for the use of passive digital objects (such as videos, for example), with low potential for student interaction; three of the four books analyzed present more suggestions in the teacher's manual than in the students' textbooks; the students showed interest in the use of simulators and pointed out their preference for active educational objects.

Introduction

The idea that Physics is a difficult subject, which depends on mathematical calculations and which few people like, is very common among high school students. As Silva (2018, p. 4) points out, "It is often not remembered as a subject of everyday discoveries, and thus becomes one of the most difficult subjects for high school students". This reality has consequences to the future relationship between students and

scientific knowledge and this experience does not stimulate the formation of the student researcher/scientist in Physics (Silva, 2018, p. 4).

From an academic point of view, this is also an issue that challenges researchers in the field of Education and Physics Teaching to look for ways to stimulate students to learn the subject. And events in the area, such as the National Symposium on Physics Teaching, bring together researchers to discuss the subject and propose solutions to the problems.

Based on these considerations, the project seeks to analyze the contributions that didactic resources can offer, especially digital educational objects (DEO), which are today made available by the networks. The intention was to focus on contributions in order to transform the conditions in which the teaching of Physics takes place, stimulating students to a more positive attitude towards the subject, despite the acknowledged challenges it can present to anyone who starts their systematic study.

Thus, the research problem was based on the possibilities that are suggested since the production of the curricular guidelines of the Federal Government for High School (Parâmetros Curriculares Nacionais, 2000) still in place. According to these official documents, it is urgent and necessary to rethink the way in which schools educate. Although unable to solve all the problems, it is possible to search for new educational tools that bring new solutions and possibilities. Many resources are available, and not exactly new, but public schools' access to them is not always easy, considering the conditions under which Brazilian public systems operate.

Young students are getting closer to technologies every day, and many are already part of their daily life, such as smartphones and internet networks, which are in schools and in the students' personal gadgets. This research has its roots in the fact that technologies are in social life, are increasingly part of the world of the youth and have become accessible even those for the poorest strata of the population. In addition to this point, the research is justified by the need to analyze the resources that are available for teachers to work with in public schools, according to government programs such as the National Textbook Program (PNLD).

School Culture, Physics Textbooks and Digital Educational Objects

This research is part of the studies carried out by the CNPq Research Group "Didactics, School Practices and Didactic Publications", which aims to analyze textbooks in their different relations with the production and circulation policies of these resources. It is not enough to study textbooks, it is necessary to understand how they are inserted in the processes of social and school organization because their production and circulation depend on other aspects, such as the value of school subjects in society, the

demands of each culture and also the relations of the publishing market (Forquin;1992; Apple,1995; Escolano, 2006).

In the Brazilian case, it is necessary to understand textbooks in relation to the evaluation processes within the National Textbook Program (PNLD), as textbooks have been affected by political decisions taken by the Federal Government since 1985, which include a process for defining how textbooks should be (formal aspects and others), what content they should have (based on the PCNs, until this moment) and what they cannot contain (errors and stereotypes, for example).

The requirements result in evaluation criteria that are used by the teams of experts responsible for evaluating and approving the textbooks so that they can be chosen by schools and teachers. Since 2009 the PNLD has been acquiring public resources and distributing Physics textbooks to high school students (Garcia, 2017). Once approved, the textbooks are included in a Guide, which presents the results of the evaluation carried out in order to support the teachers' choice. Currently, the guides are available on the FNDE website and it is therefore possible for researchers to analyze various elements that make up the evaluation and selection processes, among other processes.

One of the requirements of the PNLD is that the authors present the teachers with guidelines about the textbook, its fundamentals, its pedagogical proposal, besides methodological suggestions and complementary readings. This material is called the Teacher's Manual, following an exact copy of the content of the student's book.

For this project, it is interesting to check in the student's books and teacher's manuals whether and what kind of DEOs are suggested. Even in Brazil, where there is great social inequality, there is a strong consensus in research on the ease of access to networks and on the high frequency in which internet is used by young people, in different daily situations, in school spaces and in classrooms.

The use of technological resources can enhance didactic activities and stimulate the development of cognitive skills. In his research, Heidemann (2016) highlights a great value of complementarity between the DEO and the textbook, addressing the same subject with different approaches and offering the students different learning possibilities.

For the author, DEOs enable the development of more varied activities and can be categorized as active DEOs when they provide activities to be done by students; and as passive DEOs when they require low active student participation (Heidemann, 2016, p. 68). Still for this author, DEOs are not opposed to textbooks; they can contribute to learning in other and different ways. Among the passive DEOs, the author pointed out the explanatory videos, the informative texts, the news and the simplest simulations, which do not allow the change of parameters (Heidemann, 2016, p. 68).With these references, the following empirical research was organized.

Methodological procedures

The research used the documentary analysis of the content. The *corpus* selected are the students' textbooks and the teacher guidance manuals, which are part of the PNLD Physics textbooks. The objective of the research is to analyze the proposition of suggestions for the use of simulators by the authors of the Physics textbooks approved by the National Textbook Program (Guia PNLD, 2018) and in use in Brazilian schools. An empirical study was also developed in a public school, applying research tools for young high school students.

As specific objectives, we propose: a) to check Physics textbooks offered by PNLD for teacher selection, verifying if they establish relations with the use of other materials, especially the DEOs; to find suggestions of websites that present simulators with themes related to Modern Physics; to analyze elements of the content and the form of the simulators, verifying their possibilities of contribution to the teaching and learning of specific contents; to analyze the point of view of high school students on the use of simulators.

From a procedural point of view, the research was organized in stages, as following:

a) Analysis of the Guides from the latest notice (2018) to check the most requested books by teachers, according to official data.

b) Definition of the theme to be examined in the chosen works.

c) Reading of the selected books, both the student's copy and the teacher's manual, to find suggestions for websites presented by the authors.

d) Analysis of the websites to find suggested DEOs.

e) Elaboration of analytical charts to highlight suggested DEOs and to classify them according to Heidemann's typology (2016).

f) Performance of an activity with the photoelectric effect simulator, chosen because all the textbooks analyzed presented this suggestion. Intentionally, the content was not explained to learners prior to the simulator activity, with the expectation of verifying the use of the simulator on such knowledge.

g) Application of tools to students on the use of DEOs in Physics classes: a social-economic questionnaire and a didactic instrument on the photoelectric effect (the concept and the use of the simulator)

Results and analysis: DEOs in the textbooks and students' point of view

After the literature review, we selected the Heidemann's categorization (2016) as the main support for the analysis of the DEOs, using two categories: Passive DEOs and Active DEOs. The selection of the textbooks to be analyzed was performed and, as a result, four didactic books were chosen:
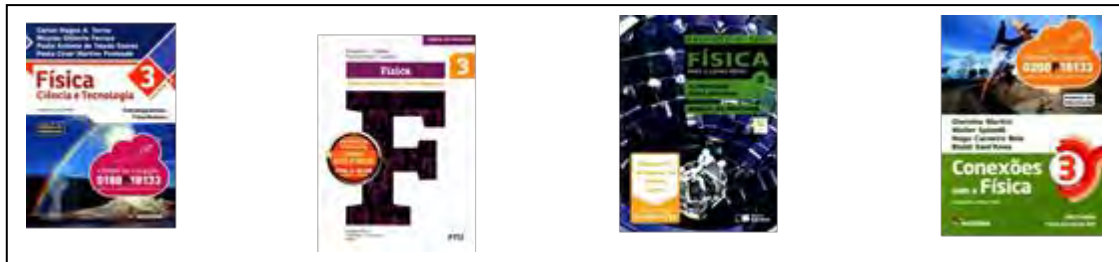
1. Física Ciência e Tecnologia (v. 3).

   Authors: C. M. A. Torres, N. G. Ferraro, P. A. de T.Soares & P. C. M. Penteado (2016).

2. Física (v. 3)

   Authors: J.R. Bonjorno, C. M. Ramos, E. P. Prado & R. Casemiro (2016)

3. Física para o Ensino Médio (v.3)

   Authors: Y. Kazuhito & L. F. Funke. (2016).

4. Conexões com a Física (v. 3)

   Authors: G. Martini, W. Spinelli, H. C. Reis & B. Sant'Anna (2016).

These titles are among the most chosen by public school teachers in the 2018 PNLD to be used during the following three-year cycle. A thorough reading of the textbooks showed that it would be interesting to focus on themes related to Modern Physics, for two reasons: The subject is considered difficult to teach and to learn and many technologies available are applications of Modern and Contemporary Physics knowledge.

Regarding the DEOs found in the selected textbooks

The results of the analysis are systematized in the following table, which shows the DEOs located in the four selected works as well as their categorization, which allows us to evaluate the expected degree of student participation when proposing such resources.

Table 1. PNLD textbooks and DEOs suggested in Modern and Contemporary Physics Themes

Book	DEO – Student's Manual	Category	DEO – Teacher's Manual	Category
Textbook 1	I- Time dilation – simulator	Active	I- Einstein Documentary – video	Passive
	II- Electromagnetic radiation - simulator	Active	II- Photoelectric effect – video	Passive
	III- Atomic models – simulator	Active		
	IV- Photoelectric effect – simulator	Active		
	V- Rutherford spread – simulator	Active		
	VI- Nuclear Fission – simulator	Active		
Textbook 2			I- Imagining the Future – video	Passive
			II- Simultaneity of events – video	Passive
			III- Einstein and the Relativistic Universe - video	Passive
			IV- The Nobel Prize saga 1,2 and 3 – videos	Passive
			V- Photoelectric effect - simulator	Active
			VI - Dissemination - PUC-SP blog	Passive
			VII - Quantum Mechanics – video	Passive
			VIII - Transmutation – video	Passive
			IX - Bóson de Higgs - video	Passive
Textbook 3	**I- Photoelectric effect – simulator**	Active	I- The Nobel Prize saga – video	Passive
			II- Atomic models – simulator	Active
Textbook 4			I- Time dilation – simulator	Active
			II- Photoelectric effect - simulator	Active
			III- operation of the LHC – video	Passive

Source: Souza's research (2019).

As results, it can be observed, based on the table, that:

a) Most textbook suggestions are passive DEOs, which require little activity from the student.

b) All textbooks have suggestions in the teacher's manual, but only two have suggestions in the student's book.

c) Active DEOs suggestions are predominant in Textbook 1, made directly to students, indicating a more active conception of learning and an expectation that books are used by students autonomously.

d) Textbook 2, the most chosen by teachers, presents suggestions only in the teacher's manual and predominantly passive DEOs, especially videos. The result is indicative of a directive pedagogical conception (Becker, 2001).

Main results of the study with the young students

Once the textbook analysis stage was concluded, we contacted a public high school located in a city in the countryside of the State of Paraná to perform the study. Once the authorization was granted, we contacted Physics teachers to analyze the aspects of using videos (passive DEOs) and simulators (active DEOs) that are available in Physics teaching. One teacher and 28 students from the last year of high school participated in this phase of the empirical study, particularly to observe the use of simulators.

Although this teacher does not commonly use the textbooks in his classes, but rather as a complementary reading for the students, he reported that he uses the simulators in class, evaluating that they increase the students' interest in the subject. "Students begin to see Physics not just as mere mathematics," says the teacher. However, the teacher pointed out some difficulties in using these objects in the classrooms: the small time load of the subject and the difficulties that students bring from other stages of schooling that limit the work with some contents.

As for the students, one element to be highlighted is the relationship they have with Physics. Out of the 28 participants, 5 said they study, like and understand the topics; 6 said they study, understand and do not like Physics; 11 said they like it but do not understand the topics; and 6 said they study and do not understand the topics studied. Thus, most students said they like Physics; however, most do not understand the contents presented. If students like Physics, why can't they understand? Is it the way the content is presented? Research on technologies can contribute with answers to these questions.

Most students (21 of them) said they had had previous experience with simulators at school, but some students reported that the use of these types of DEO is rare. Regarding the use of videos (Passive DEOs) and simulators (active DEOs), the students expressed their preference for the simulator, explaining that they "allow easier appropriation of the content", "are flashier" and present the subject in a "less boring" way.

All the students found the didactic activity proposed as part of the research interesting, making comments from more general perspectives - "it is easier to visualize the process", "it is a fun technique to learn the subject" - and more elaborate such as this, in which the student highlighted exactly the purpose of the simulators: "it was very interesting to see something virtually represented that is difficult to see in reality". When asked if they found it difficult to work with the simulator, 3 students answered yes; 6 students answered they found it a bit difficult, claiming that they had never studied this content, which made

understanding more challenging. But the majority (19 students) stated that there were no difficulties with the simulator.

One of the objectives was to verify if the use of the simulator would enable learners to understand the concepts being worked. When asked what they could learn about the photoelectric effect from the simulation, most students showed that they had made some approximation with the concepts involved, explaining: "I learned that the higher the frequency the more electrons came out of the metal, and that a battery can increase the speed". However, some students did not have the same success, as in the case of the student who said: "The electrons are released according to the intensity of the light". It is known that the emission of electrons from a sheet metal by the photoelectric effect depends on the frequency of the light being emitted and the material of the sheet, and not on the intensity of the light.

Finally, when asked if they would recommend simulations for someone who wants to learn Physics, 26 students answered yes. Some comments were noted: "I would recommend it, because simulation makes the class more interesting"; "Yes, it is more interesting when there is a demonstration"; "Yes, it is much more practical to understand"; "Yes, I would recommend it, because it gives us an insight into what happens in reality".

Thus, it can be stated that the students evaluated the use of simulators for the teaching of Physics in a positive way. In general, they stated that it is possible to have a more efficient "visualization" of the phenomenon studied with the simulator, making the process of teaching and learning more interesting, highlighting the understanding of students on the motivating role of the simulator.

Final Considerations

The results regarding the documental analysis performed in the Physics textbooks are interesting because they establish relationships between the pedagogical conceptions of the authors of the textbooks and the way the Digital Educational Objects are recommended.

The results allow us to identify Textbook 1 - which presents most DEOs in the student's book and in the active category - as a book that values student autonomy. Textbook 2, which has most of the DEOs suggested only in the teacher's book and in the passive category, is consistent with the evaluation that it is a book with a more traditional conception of teaching and learning. The inclusion of the DEOs did not change the central pedagogical structure of Textbook 2.

The students have greater classroom activity with the simulations, which can stimulate more and better learning, making classes more interesting. Another fact is that students have the chance of a more active interaction in class, which can stimulate more and better than a simple expository class.

It is important to stress that the "Z generation" (Santos & Franco, 2010, p. 14), which corresponds to the people born after 1993, has increasing and early access to technologies such as mobile phones, tablets, computers, among others. According to the authors, "The tendency is that they have the headset in their ears all the time, at the same time that they are performing other activities and watching TV. That's why some call this generation the 'silent generation'. Fast and agile with computers, they have difficulties with traditional school structures (...)".

It can be affirmed that in this way, it becomes more and more difficult to get the attention of young students using the traditional methods, since they are used to always being very stimulated. Therefore, there is an eminent need for teachers to resort to new teaching methods, which can even be these same technologies, in order to capture the students' attention, stimulating them to study the content in question.

Despite being positively evaluated by the students, the need for teacher mediations between the Physics knowledge and the simulator was maintained in order for the students to understand the phenomenon.

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Guidelines on Physics evaluation processes present in teacher's manuals distributed by the PNLD (Brazil)

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Abstract

The discussions regarding methodologies of Physics teaching for High School students have been intensified since the curricular reforms that took place in Brazil in the 1990s, aiming to face the difficulties in teaching and learning this knowledge that is traditionally recognized in the school culture of the country. However, literature reviews show that the discussions about the evaluation of learning in this subject have not occupied equivalent space in public debates, events and scientific publications. Considering the existence of a public policy for the distribution of textbooks for schools, that include orientations to the teachers on evaluation, the research questions were formulated towards guidelines on conceptions and evaluation procedures presented by the authors in the Physics textbooks approved by the National Textbook Program (PNLD). The research is documentary and the empirical material is composed of two didactic collections of Physics for High School, approved in the 2018 PNLD. The data were produced from the analysis of the teacher's manual, giving particular attention to the following elements: a) suggested procedures for teachers; b) evaluation instruments and procedures presented; c) conceptions and purposes of the evaluation. The results showed that there is a predominance of guidelines within General Didactics, which suggests a deepening of the analysis of the relations between the references used by the authors of the selected works and the conceptions present in the official curricular documents to evaluate the Physics knowledge.

Introduction

The research is part of a set of studies that focus on Physics textbooks in their different relations to the policies of production and evaluation, and also their use by teachers and students in school life. Coordinated by the Center for Research and Didactic Publications/UFPR, the researches investigates

the elements that are part of the complex relationship in which the textbooks are inserted (Julia, 2001; Forquin, 1993)

In the case of Brazil, researchers should consider the fact that textbooks have been distributed free of charge to students in public schools, at all levels of education and for every school subject. This is an action coordinated by the federal government, the National Textbook Program (PLND). In the case of Physics, the PNLD has been evaluating, purchasing and distributing Physics textbooks with public resources to high school students since 2009.

Once approved, after the evaluation process according to criteria published in public notices, the textbooks are included in a Textbook Guide, available for consultation by digital means. One of the requirements of the PNLD is that the authors present guidelines to teachers regarding the textbook, its principles and pedagogical proposal, in addition to methodological suggestions and complementary readings. This material is sometimes referred to as the Teacher's Guide. The students' evaluation process is one of the themes that should be addressed in these orientations, and this is the theme of the research here reported.

The question is: how do the authors guide teachers in the evaluation process? The exploratory study seeks to provide answers to this question.

The evaluation as a relevant theme in the field of Physics Teaching

The importance of the matter is unquestionable when it comes to the teaching of Physics, a subject with usually very high failure rates or which is referred to by students as very difficult to learn.

In Brazil, the Teaching of Physics was one of the first fields to be organized for research and a systematic and institutionalized discussion regarding teaching, as it became evident in the Acts published in the Bulletin n. 4 of the Brazilian Society of Physics with the title "National Symposium on the teaching of Physics", in December of 1970. In the document, the problems related to the teaching of Physics are related to the training of teachers, the structure of schools, the teaching career and the didactic and methodological aspects of teaching, such as content and procedures.

We point out elements of the exhibition made by Beatriz Alvarenga, from the Federal University of Minas Gerais, co-author of a textbook series that has been circulating in Brazilian schools and in some countries of Latin America for decades. She said: "We venture to formulate hypotheses about the main flaws observed and that we believe to be, almost generally, in our didactic experiences". Next, she lists the problems, including the small result obtained in teaching, the classes that do not arouse the students' interest, the "book and academic" teaching, the absence of "more concrete problems"; and finally, she

emphasizes that the evaluation is made "aiming only at the knowledge that, most times, is low" and that the "transformation expected in students" is unknown (Alvarenga, 1970, p. 20).

The course of the following decades brought transformations in the Brazilian educational system, resulting from the Law of Guidelines and Bases of National Education - Lei 5692/71. Constructivist perspectives, especially based on Piaget theories, were incorporated into complementary norms and suggested forms of evaluation to accompany the development of students, guided by instructional objectives.

In the 1980s and 1990s, educational discussions pointed to the exclusionary and classifying nature of evaluation processes in Brazil, in works such as those of Luckesi (1995) and Garcia (1996). The concepts of evaluation as an ongoing process gained strength and in the field of Physics teaching, there are concerns with the topic, in particular establishing relationships with teacher training (Carvalho, 1991, p.162).

At the end of the 1990s, Law No. 9,394/96 (1996) established that "the verification of school performance shall observe the following criteria: continuous and cumulative evaluation of the students' performance, prioritizing qualitative aspects over quantitative ones and results throughout the entire term over those of eventual final exams" (1996, art. 24, V).

As for the official documents produced in Brazil from this legislation on, it is noted that in the Curriculum Guidelines for High School (Orientações Curriculares para o Ensino Médio, 2006) there is no clear reference to the evaluative processes in the specific content of Physics. In the adopted curricular model, the knowledge was organized based on competences that the student must develop in each of the areas, not specific to each school subject and not related to content or themes.

The generalist perspective is also found in other documents published in the years 2000 (National Curriculum Parameters – PCNs, 2000a; and PCN+, 2000b). However, there is a specific reference in the second document: "The teaching of Physics has ceased to focus on the simple memorization of equations or automated repetition of procedures, in artificial or extremely abstract situations, increasing the awareness to the fact that it is necessary to give it meaning, explaining its meaning already at the time of learning, in High School itself" (2000b, p. 60).

From these standards, the theme of evaluation has gradually gained space in events in the area, with researches on practices and propositions for the classroom. They overcome the general discussions - which are also relevant, but insufficient - by focusing on specific disciplinary knowledge. It is noteworthy, for example, the research by Bueno, Horii and Pacca (2013) that proposes ways of recording the teaching and learning processes of high school students, in a specific curriculum theme, emphasizing the procedural and continuous character of the examination.

In the Didactics of Physics, the difficulties traditionally pointed out in relation to the teaching and learning of the subject suggest studies not only on teaching methodologies, but also on the evaluation processes proposed in the PNLD-approved textbooks. Despite the difficulties and limits of this program, the textbooks are purchased by the federal government with public resources they reach all public schools and, therefore, should be the focus of attention of teachers and researchers. In addition, in the Teacher's Guide, which must accompany textbooks, there are didactic guidelines on evaluations that, in theory, teachers could incorporate into their practices.

Considering the references presented, evaluation in Physics textbooks is the focus in the research presented. In addition to the cited authors, the evaluation and its relationships with other elements of school life was supported in Perrenoud (1993), author referred to in many works in the country in recent decades.

Methodological procedures

The research consists of an exploratory study. The data was produced through documentary analysis, to look into the guidelines in the Teachers' Manuals, which are part of the PNLD Physics textbooks.

The general objective of the research was to analyze the evaluation proposals available in the textbooks that were approved in the PNLD, which are available to High School Physics teachers, especially the didactic and methodological guidelines elaborated by the authors. As specific objectives, it was proposed to identify the conception of evaluation used by the author of the textbook; identify evaluation procedures and strategies suggested in the guidelines; and analyze the contributions that the guidance can make in organizing the teachers' evaluation.

From a procedural point of view, the research was organized in five steps, developed between 2018 and 2019.

a. Identification of the 2015 and 2018 PNLD approved collections indicated in the Textbook PNLD Guide, available at the FNDE webpage.

b. Selection of textbooks approved in the 2018 PNLD to be analyzed.

c. Definition of elements of analysis, based on bibliographical review.

d. Reading of the orientation given to the teachers on the evaluation process.

e. Analyses and systematization of the results based on the categories chosen from the theoretical references.

The theoretical frameworks that support the research allow us to understand that teachers use textbooks in very different ways and that one cannot infer that the suggestions given are carried out (Rockwell & Ezpeleta, 2007). Despite this fact, the analysis of the textbooks is necessary to situate the propositions

and to verify their adequacy to the national curricular orientations and the theoretical debates in the educational field, their possibilities and limits. Thus, the research intention is to know the adequacy between the contemporary educational theory on evaluation processes and the orientation given by the Ministry of Education through the curricular and textbooks policies, particularly to the High School. This study could be a contribution to increase the textbook quality as an instrument to teachers' professional development – a role pointed up by the Ministry and by the PNLD.

Results: evaluation in the Physics textbooks

The results of the analysis conducted in the two collections approved in the 2018 PNLD are presented below. First, the general elements of the collections will be presented and secondly, the results obtained in the analysis of each of them (Textbook A and Textbook B). The following is a comparative summary of the two textbooks.

The analyzed materials

The first collection (Textbook A) was the most requested by Physics teachers from public schools enrolled in the program, according to official data. It is a textbook traditionally well accepted by teachers, even before the high school program existed. The collection is identified by teachers as a traditional way of teaching, despite some changes made by the authors to adjust it to the PNLD criteria.

In the 2018 PNLD Guide, in a section called "overview", the evaluators point out that the collection "presents the contents usually focusing on high school (...), organizing the approach of the subjects from a main structure composed of texts and exercises", adding that "the main emphasis is assigned to quantitative exercises" (Guia, 2017, p. 76). This evidences that the textbook favors a traditional organization of knowledge, presenting the concepts at the beginning of chapters, or along them, and then introducing several exercises arranged in columns, favoring the mathematization of content and calculations. The Guide also informs that the evaluation is widely discussed, both in the sense of monitoring students' learning, and in the improvement of the job of teaching (Guia, 2017, p. 76).

The second collection (Textbook B) showed positive results in research by Souza (2018), because it suggests more active than passive digital teaching objects, both in the student's book and the teacher's manual. For this reason, it was considered as a book that surpasses the traditional conception of teaching, directing suggestions directly to students and, thus, stimulating their autonomy in the construction of knowledge.

According to the evaluators of the 2018 PNLD, the book presents the concepts of Physics traditionally addressed in High School, in addition to themes related to Modern and Contemporary Physics. The

evaluators state that: "The discussion of the topics is conducted comprehensively and the presentation of concepts, laws and theories, is developed rigorously, and the mathematical expressions are presented clearly, accompanied by instructions and inferences". Furthermore, they emphasize that "the contextualization of the themes is performed mainly in the introduction of chapters and special sections where the relationship of the contents with the experiences of the students' daily lives is confirmed" (Guia, 2017, p. 57). As for the teacher's manual, the evaluators say that it brings "very relevant discussions on teaching practice in high school and the formative objectives of Physics teaching". They also point out that the indications presented may contribute to continuous teacher improvement (Guia, 2017, p. 59).

What the textbooks suggest to teachers regarding evaluation

The following results respond to the objectives of the research regarding the analysis of the conception and evaluation procedures suggested by the authors of the two didactic collections to Physics teachers.

Analysis of Textbook A

a) Regarding the procedures: The authors suggest that the evaluation should focus on the 15 competences proposed in the National Curriculum Guidelines related to: representation and communication, research and understanding and socio-cultural contextualization. They explain the way the activities can be articulated to the students' daily lives, how some group activities or experiments can be applied in class, as well as the texts activities and calculations. But they explore little on how to relate the procedures and the conception of competences, a challenge for teachers in their evaluation practices, since the tradition in the country is the evaluation of conceptual knowledge and not of competences.

b) Regarding the instruments: The authors point out that "continuous evaluation with diverse instruments" can be a good way to ensure learning. They criticize the use of tests, pointing out that this type of evaluation activity can cause anxiety in students and thus cause "banal errors", which harm not only the student, but also the teacher in his/her work. They suggest that other instruments be prioritized, but they are not described. The indications are generic and there are few examples that establish the relationship between the Physics knowledge proposed in the student's book and the procedures for assessing the competences related to that knowledge.

c) Regarding the concepts and purposes of evaluation: Referring to a continuous and formative evaluation as a more appropriate way to evaluate, they establish a relationship with the conceptions present in the official curriculum documents. The authors criticize the traditional school of "transmission of knowledge", placing the focus of examinations in the development of skills. They point to the need of

identifying students' difficulties and trying to solve them, but in a different way from the concept of "continuous" and "formative" evaluation, they suggest the "recovery" of students to solve their difficulties.

Analysis of Textbook B

a) Regarding the procedures: The authors claim that the evaluation should be continuous, systematic, functional, complete and formative. It must occur in all classes and must also be planned in advance. In the teacher's manual, the authors say that "the evaluation is useful because it deals with formative objectives, which are external to the teacher and should therefore all be considered". The textbook presents three central forms of evaluation - diagnostic assessment, formative assessment and summative assessment - and describes how each should be implemented.

b) Regarding the instruments: The authors point out the necessary characteristics of the instruments - validity, reliability or precision and objectivity (with previously developed correction criteria) and present examples of evaluative instruments, citing the use of essay tests and objective tests, case records, cumulative records and inventory. They explain in detail how each of these instruments can be used.

c) Regarding the design of the evaluation: By specifying elements of Physics Teaching, the authors say that an initial diagnostic evaluation is interesting to situate how much mathematical knowledge each student has acquired in terms of basic operations and first degree equations, what they know in terms of Physics concepts from previous years and their logical reasoning when solving problems. They suggest that the teacher standardize the ways in which he/she intends to evaluate, facilitating the students' understanding of where they need to go or what they need to do. The Teacher's Guide emphasizes the diagnostic assessment at the beginning of the school year, also suggesting its use in other moments, reorganizing the classes, if necessary.

Comparative summary

Comparing Textbook A to Textbook B, it can be seen that the second has greater specificity in relation to the Physics subject, with the inclusion of several examples that show how the teacher can evaluate the student properly.

Table 1. Elements regarding evaluation obtained in the analysis of textbooks A and B

Textbooks	Procedures	Instruments suggested	Conception
Textbook A	The evaluation should be done based on the competences Natural Science presented in the National Curriculum	They are diverse but poorly detailed. There are no specific references exploring how to evaluate Physics knowledge	Evaluation is suggested as a continuous process. The suggestions show tables for self-evaluation, but only included behavior and attitude elements. Physics knowledge is not included.
Textbook B	The evaluation should be done based on the competences Natural Science presented in the National Curriculum	They are diverse and detailed. There are some examples exploring how to evaluate Physics knowledge	Evaluation is suggested as a continuous process. The evaluation should be diagnostic, formative and cumulative. The conception is more appropriate to the new educational conceptions presented in the official documents for Physics Teaching.

Source: Cunha (2019)

Despite proposing a continuous evaluation process, more appropriate to current educational models, the guidance in Textbook A suggests "recovery" for underperforming students in situations where the teaching and learning process did not occur as expected. The idea of retrieving knowledge or skills makes no sense according to the educational conceptions of current curriculum documents. The instruments of evaluation suggested in textbook A are diverse but poorly detailed in the teacher's manual.

Textbook B does not present the idea of retrieving knowledge. The authors emphasize that the assessment should be performed in three stages: diagnostic assessment, formative assessment and summative assessment. They detail several examples of how to do each one, as well as examples of activities that can contribute to both the students and the teacher in this process. Textbook B presents the idea that evaluation is subjective, although we try to make it objective. It suggests various activities and instruments to the teacher, such as objective tests and essay tests, classroom activities, exercise solving and experiments.

Final Considerations

The analysis performed evidenced the existing difficulties to elaborate orientations regarding the evaluation processes. Concepts circulating in educational discourse in recent decades have been appropriated in the text, but the relationships with the specificities of Physics are little explored.

The guidelines for organizing the evaluation processes are general and could be used in other subjects' manuals without much difficulty and with few modifications, thus observing an excessively restricted approach to the specificities of learning Physics, which is referred from the competences established in the National Curriculum Guidelines (PCNs) and the National High School Examination (ENEM).

The research will continue to extend the analysis to other collections, with different characteristics and with different degrees of acceptance among teachers. It would be interesting to compare the solutions presented by the authors to incorporate the different theoretical framework on evaluation processes in the guides by teachers' orientation; and it could also be interesting to understand the ways used by each author to include the national curricular orientations and to get the textbook approve in the PNLD.

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The relationship between the given and anticipated range of knowledge in textbooks: A quantitative analysis of Japanese science textbooks from the 5th to 8th grades

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Abstract

How are terms given in the descriptions of knowledge in textbooks? In other words, how comprehensive are the concepts given in textbooks in terms of the system of knowledge that the textbooks are to convey? The "primary-secondary learning gap" has long been discussed in Japan. Many students suddenly have difficulties in understanding subjects when they enter junior high school. Despite the fact that textbooks are one of the most important learning instruments, the qualitative change in the content of textbooks has not been examined in light of the primary-secondary learning gap. In this paper, we show that there are clear gaps between primary school textbooks and secondary school textbooks in the ways of description of knowledge. We picked up science textbooks from grades five to eight, that is, the fifth and sixth year of the primary school and the first and the second year of the secondary school. We focused on terms that represent concepts and evaluated how their occurrences in textbooks suggest readers to anticipate the potential range of terms, by extrapolating the text size to infinity. We used the large number of rare events (LNRE)models. We observed that, in primary school textbooks, terms are on average used much more frequently. We also revealed primary school textbooks are written in a self-sufficient way in terms of concepts while secondary school textbooks make readers anticipate there are more terms than those given in the texts. This may well be one of the causes of primary-secondary learning gap.

Keywords

Concepts, school textbooks, range of knowledge

Introduction

In the educational setup, knowledge is transmitted from those who know to those who do not know. In this setup, language expressions - the main medium used for transmitting knowledge - play an essential role. People who have not known the knowledge come to understand it through language expressions. A question thus inevitably arises: how language expressions are organized in educational media. In this paper, we focus on school science textbooks and observe how knowledge is represented in the textbooks. Below let us clarify the research question and put it within the social context.

Research question

We focus on school textbooks, because textbooks are one of the most important materials in learning at school. The focal point is what kind of language expressions are used in the textbooks, in terms of the function of the textbooks, i.e. to transfer knowledge.

Readability studies address how language expressions are organized in relation to readers. Several well-known measures, such as the Flesch-Kincaid measure, have been proposed and used so far (Zakaluk and Samuels, 1988; Feng et al., 2010). These are, however, not concerned specifically with the transfer of knowledge. In this paper, we specifically focus on how knowledge is organized in the textbooks. More specifically, we observe how technical terms (henceforth terms) are used in the textbooks, because terms represent concepts, which constitute the basic elements of knowledge.

Our general research question can be put as: how are terms given in the descriptions of knowledge in textbooks? As we are concerned with the description of knowledge in textbooks, we needed to delve into the relationships between descriptions and the system of knowledge. Hence, we postulated a more specific research question, which is how comprehensive are the concepts given in textbooks in terms of the system of knowledge that the textbooks are to convey? As we will detail later, we analyze 4 Japanese science textbooks from grade 5 to grade 8.

Primary-secondary learning gap

Our research has a background context, i.e. so-called "primary-secondary learning gap", which has long been pointed out as a serious problem in education in Japan. Many pupils suddenly find it difficult to understand subjects when they enter junior high school or 7th grade. People have given different explanations to this phenomenon. For instance, the sudden change in the style of teaching, increased difficulties in subject content, and so on (Itou, 2013). As most students do not know the content of the subject knowledge ahead of learning, what they have in understanding the knowledge are language or

symbolic expressions of knowledge. Nevertheless, possible changes in the styles of descriptions in textbooks have not been examined so far.

The rest of the paper is organized as follows. In section 2, we describe the textbooks we adopted for the analysis. In section 3, we give the basic quantitative characteristics of the textbooks. Section 4, the main part of this paper, is devoted to observing the description of knowledge in these textbooks from the point of view of the relationships between the given and anticipated range of knowledge. Section 5 concludes this paper.

Data and methods

Data

We adopted science textbooks from grades five to eight, that is, the fifth and sixth year of the primary school and the first and the second year of the secondary school, as we are concerned with primary-secondary learning gap. We use P5, P6, S1 and S2 to refer to the textbooks of the fifth, the sixth, the seventh and the eighth grade, respectively. All these textbooks are published by Tokyo Shoseki. The school share of these textbooks is on average 35%.

	#SENTENCES (S)	#WORD TOKENS (WTK)	#WORD TYPES (WTY)	#INDEX TERMS (T)
P5	1067	16962	1621	63
P6	1214	20092	1782	97
S1	1168	23904	1989	158
S2	1292	27486	2069	174

Table 1. Basic quantities of the main elements in the textbooks

Table 1 shows the number of sentences (S), the number of word tokens (WTK), the number of word types (WTY), the number of index terms (T).

The type–token distinction is the difference between naming a class (type) of objects and naming the individual instances (tokens) of that class. Since each type may be represented by multiple tokens, there are generally more tokens than types of an object. The quantity of word types implies a diversity of vocabulary in the text, contrary to this, word tokens represent amounts of text.

We used index entries as terms that represent concepts. As textual parts, we used sentences and sentential parts from the main body of the texts and chapter or section titles. Sentences were decomposed into words by using a Japanese morphological analyzer MeCab (Kudo, 2004).

	WTK/S	WTK/WTY
P5	15.9	10.5
P6	16.6	11.3
S1	20.5	12.0
S2	21.3	13.3

Table 2. Average length of a sentence and average frequency of a word

Table 2 shows average length of a sentence as counted by the number of words (WTK/S), and average frequency of a word (WTK/WTY). We can see a gap in sentence length between the primary school textbooks and the secondary school textbooks.

	#TERM TOKENS (TTK)	#TERM TYPES (TTY)	TTK/TTY	(WTK/WTY)	S/TTY	WTK/TTY
P5	1668	63	26.5	(10.5)	16.9	269.2
P6	2382	97	24.6	(11.3)	12.5	207.1
S1	1929	158	12.2	(12.0)	7.4	151.3
S2	2208	174	12.7	(13.3)	7.4	158.0

Table 3. Summary statistics of the main features of text

Table 3 shows the number of term tokens (TTK), the number of term types (TTY), average frequency of a term (TTK/TTY), average number of sentences per term (S/TTY), and average frequency of word tokens per term (WTK/TTY). Terms are used much more frequently in primary school textbooks than in secondary school textbooks, and the number of both sentences and word tokens consumed for a term is much larger in primary school textbooks than in secondary school textbooks. This shows that primary

school textbooks devote much more explanations on average per terms. Note that ordinary words do not show the gap between primary and secondary school textbooks.

Methods

Summary statistics, however, are not sufficient for analyzing the quantitative nature of linguistic items in general, because their distributions are highly skewed, and when we extend the data, unseen items almost always occur. We thus need to observe the distributional nature of terms, and adopt specific methods that take into account the skewed nature of items in fully exploring the nature of occurrence of terms in the textbooks.

Based upon this understanding, we will observe the developmental profiles of the occurrences of index terms in section 3, which is a common point of observation in describing textual characteristics in relation to content words (Baayen 2001). We will then analyze, in section 4, the relationship between the given and anticipated knowledge in the textbooks, which constitutes the core part of our work. Let us elaborate on the methodological and conceptual framework here used for this analysis.

As stated above, unseen items almost always occur when texts are extended in the case of language data. The amount of unseen items expected to occur correlates with how items occur in the given text. Put differently, some texts may make readers to expect many unseen items to occur when texts are extended, which means that the readers see texts as not self-contained, while others make readers to expect few unseen items and give readers the impression that the texts are complete or self-contained.

This can be intuitively explained as follows. Suppose we have a magic fruit box, which contains infinite tokens of fruits. When we took 10 fruits and obtained 10 apples, we may well think that the box only (or mostly) contains apples, and expect that the 11th fruit would also be an apple. If we obtained three apples, two oranges and bananas, a mango, a papaya and a kiwi, on the other hand, we would expect the 11th fruit would be something new. The distributions of fruits actually obtained affect our expectation of what would occur. If we do not expect any new types, we tend to see that the given types already exhausted the possible range of types.

The distribution of terms in a text make you anticipate, if implicitly, the range of terms not given in the text. If the anticipated range of terms is large, learners may feel that the system of knowledge given in the descriptions of texts is incomplete. The gap between the given and the anticipated range of terms, which can be regarded as representing the whole system of knowledge, can thus be an interesting viewpoint from which textbooks are characterized, and the ratio between the given terms and anticipated terms can be interpreted as the degree of sufficiency of textual descriptions in terms of the system of knowledge.

There is a technical framework, called large number of rare event (LNRE) models, which enable us to estimate the potential number of items based on the given distribution of items (Baayen, 2001; Evert and Baroni, 2007). The LNRE models has been successfully applied to a range of lexicological, terminological and textual analysis. Baayen and Lieber (1991) and Lüdeling and Evert (2004) applied the method to analyze productivity of morphemes. Miyata and Kageura (2019) evaluated the effect of terminological control by using the method. Asaishi (2017) used the method to characterize high-school science textbooks, and Kageura (2019) examined the effectiveness of using the method to evaluate the difficulties of specialized texts in translation education setup.

In these studies, the merit of estimating the potential number of items in focus based on the given data was fully exploited. In our case, the relationship between the potential number of index terms and the number of terms in the texts can be interpreted as reflecting the self-containedness of the textbooks. Although LNRE models assume randomness of occurrences of items and discard discoursal structure, this assumption may in the current context be interpreted as mapping textual description to the system of knowledge. The full analysis will be given in section 4.

Distribution of terms in texts

Figure 1 shows the transitions of the mean frequency per term as texts proceed. To smoothen the small local fluctuation, we adopted the moving average for the window of 30 words. Mean frequencies in primary school textbooks P5 and P6 become larger in the second part of the textbooks, while they remain almost constant in S1 and S2. This means that the descriptions of knowledge in P5 and P6 depend more heavily on or devoted more to the already introduced concepts, while S1 and S2 keep introducing new concepts towards the end of the textbooks.
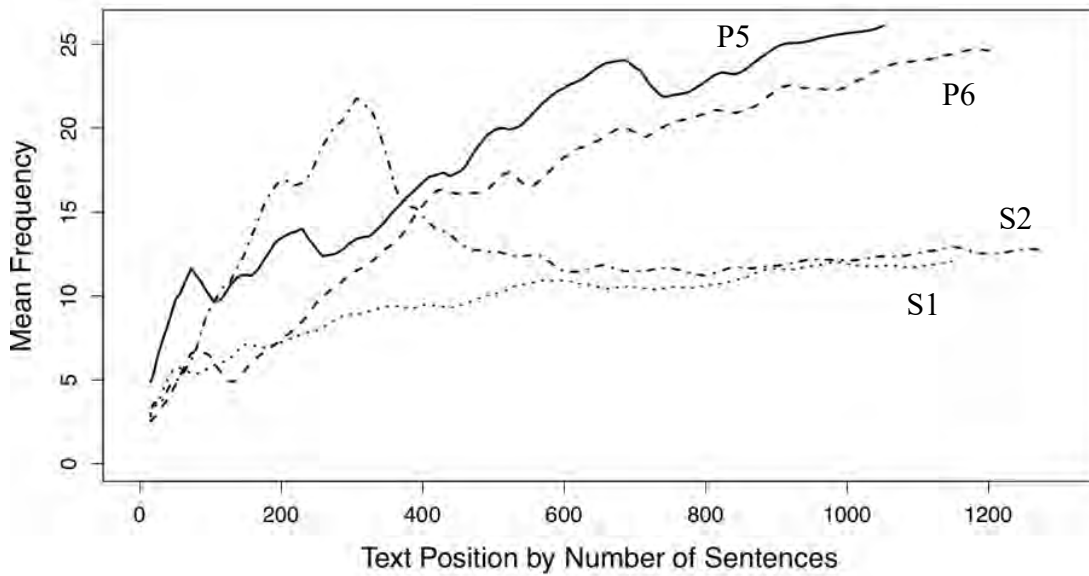
Figure 1. Transitions of the mean frequency (P5, P6, S1, S2 means 5th, 6th, 7th, 8th grades)

Figure 2 shows the log-log plot between the number of occurrences (m) and the number of term types that occur m times (Vm). The distributions of terms in P5 and P6 are exceptional as word distributions in general (Baayen, 2001) and term distributions in particular (Asaishi, 2017), while distributions in S1 and S2 more or less follow general word or term distributions. The distributional patterns of terms in secondary school science textbooks for higher grades given in Asaishi (2017) are similar to those in S1 and S2; they follow what is commonly known as Zipf's law (Baayen, 2001).
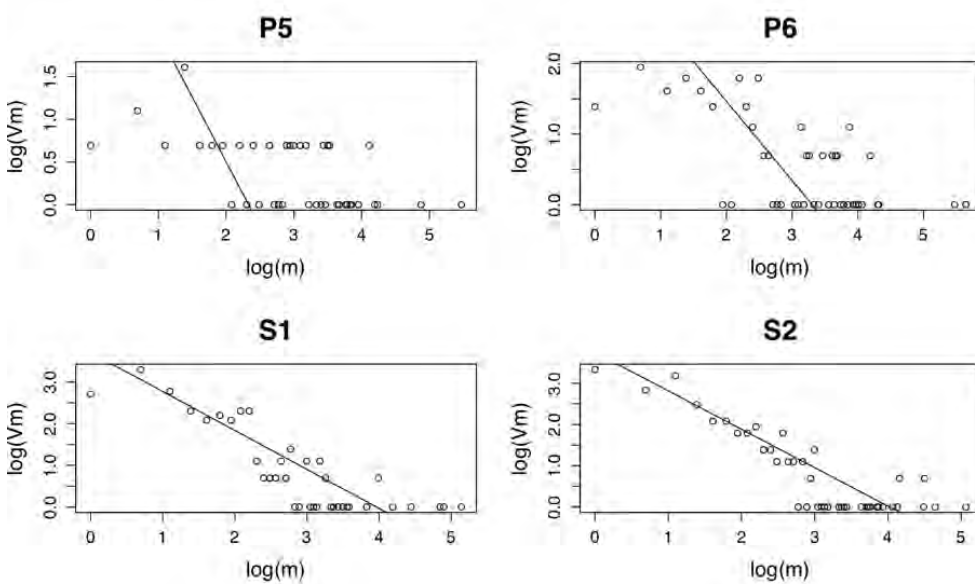
Figure 2. The distributional patterns of terms

Given and anticipated range of knowledge

Figure 3 shows the empirical growth curve of term types for the four textbooks. The growth curves of new terms flatten out towards the end of the P5 and P6 texts.
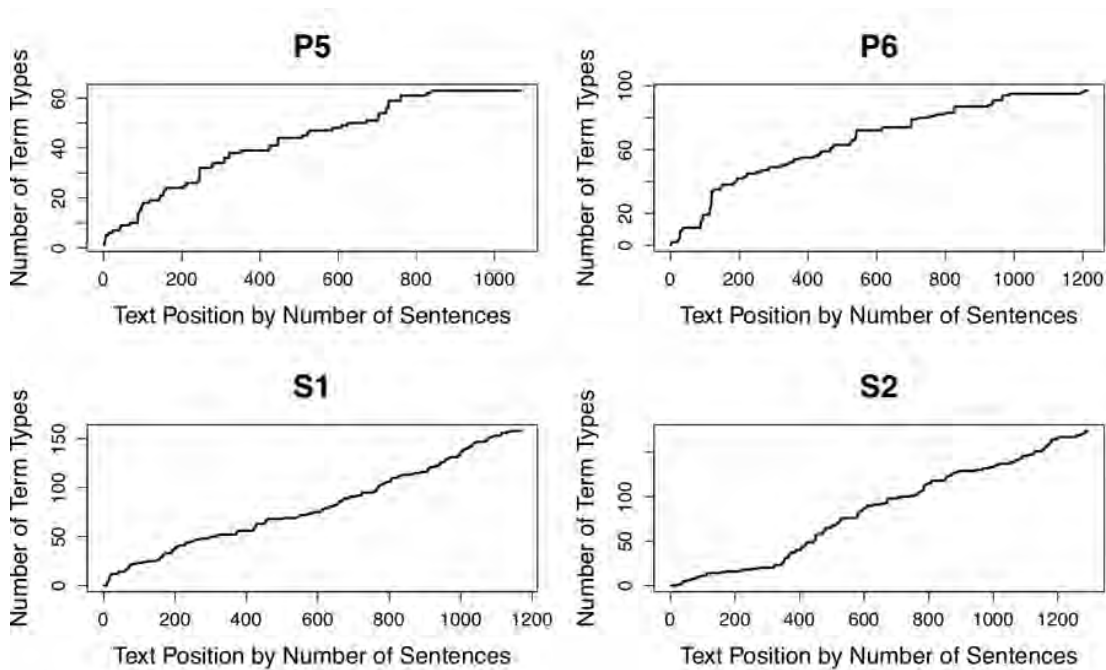
Figure 3. The empirical growth curve of term types

So if we extrapolate the texts of P5 and P6, we reasonably expect that new terms/concepts would not occur. On the other hand, the growth curves are almost linearly growing in S1 and S2 until the end of the texts. So if we extrapolate the texts of S1 and S2, we expect that new terms/concepts would occur in the same pace.

This argument, however, is about descriptions of texts and not about the range of knowledge covered. To give anticipated concepts or terms in the system of knowledge, we applied LNRE models to the data. We examined several parametric distributions and chose the best fit models among different parametric distribution, which happen to be all Generalized inverse Gauss-Poisson model.

Figure 4 shows the result. Broken lines show the model estimation. For P5 and P6, few new terms are expected to occur even when the texts are extended to twice the original size. By contrast, for S1 and S2, we expect some new terms will occur.
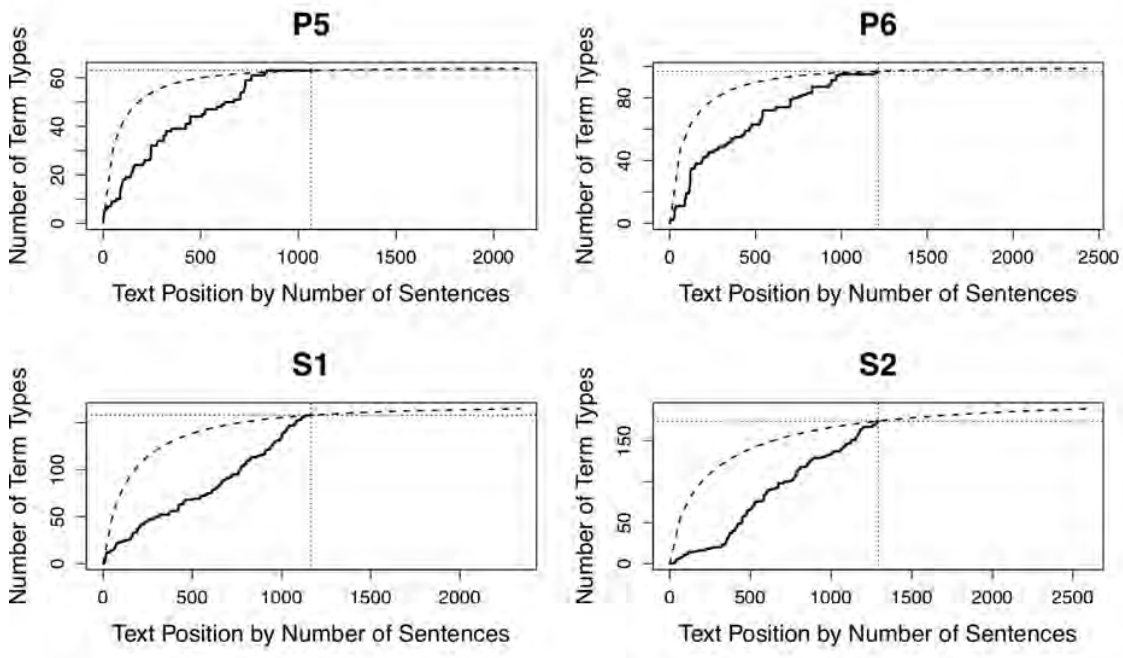
Figure 4. The range of knowledge

Table 4 shows the given numbers of term types, the expected numbers when the text is extended to infinity, the number of new terms and the ratio between given and expected term types.

	#TERM TYPE (TTY)	#EXPECTED TERM TYPE (E)	#NEW TERM TYPE	TTY/E
P5	63	63.92	1	98.6
P6	97	98.98	2	98.0
S1	158	166.96	9	94.6
S2	174	198.11	24	87.8

Table 4. Summary of the results

For P5 and P6, terms/concepts given in the texts cover almost all the necessary concepts for the system of knowledge supposed to be addressed in the texts. For S1, more than 5 per cent of terms/concepts need to be newly introduced to cover the system of knowledge supposed to be addressed in the text. For S2, more than 12 per cent of terms/concepts need to be newly introduced to cover the system of knowledge supposed to be addressed in the text.

We could confirm here that primary school textbooks describe knowledge in a self-sufficient way in terms of concepts, while secondary school textbooks are described in such a way that the readers may feel that there are concepts that are not given in the textbooks.

Conclusions

We analyzed the descriptions of knowledge in textbooks from Grade 5 to Grade 8, focusing on technical terms. We observed that there are clear gaps between primary school textbooks and secondary school textbooks in several respects. We observed that, in primary school textbooks, terms are on average used much more frequently. The distribution of terms in primary school textbooks do not follow ordinary distributional patterns. In relation to this surface characteristics, statistical analyses revealed the most important finding with respect to our research question, i.e. primary school textbooks are written in a self-sufficient way in terms of concepts while secondary school textbooks make readers anticipate there are more terms than those given in the texts.

While the analyses reported in this paper did not observe the effect of these terminological characteristics on learners, it is natural to hypothesize that these textual characteristics may affect the understanding of subject contents by learners. This may well be one of the causes of primary-secondary learning gap. We will try to clarify further the relationship between textual characteristics revealed here and issues in learning by using school textbooks.

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Educational resources: The educational resource as symptomatic of/or embedded in contextual structures and constructs

Subtle racial patterns in textbooks

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Introduction

This paper presents findings based on analyses of three chemistry textbooks for primary school published between 2011 and 2015.[24] The study was carried out in 2018, as a follow up of an earlier study of mine (Eilard 2018) that was presented at IARTEM 2017 (Eilard 2019), which was in turn based on an earlier national textbook evaluation originally carried out by the Swedish Schools Inspectorate (2011). The ambition was to gain a deeper understanding of the previous findings (Eilard 2019, 2018) as well as testing them on later textbook editions. The earlier study (ibid) concluded that the books that were originally evaluated revealed traces of a symbolic (white) ethno-racial structure that was shown not least through numerous depictions of white hands. Some of those textbooks, in the original material, were however published some 15–30 years ago, which itself is a rather interesting discovery. Consequently, I wanted to assess and compare the findings in them with later textbook editions, published after the 2011 education policy reforms in Sweden.

Thus, the purpose of the study was to further explore and scrutinise the findings of the previous study by Eilard (2019, 2018) and compare them with corresponding textbook material (i.e. later editions) of current primary school textbooks in Sweden. In particular:

- How do the results of the earlier study (Eilard 2019, 2018) compare with later editions of the same textbooks?
- Are the findings of the first study (Eilard 2019, 2018) consistent (reproduced) in later editions of the same textbooks, or have they changed in any way, and in that case, how?

Nordic textbook research within the field

Knudsen (2009; 2016) uses the concept "ethno-race" in her intersectional analyses of whiteness in textbooks for Norwegian secondary schools, to show how whiteness is formed by ethnicity and race in the same way as gender usually is related to sex in the construction of masculinity and femininity. Knudsen also draws on the concept of whiteness put forward by Dyer (1997). Whiteness, according to Dyer, is inherent in Western norms and

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[24] This is a short version of a full paper/article that was presented at the IARTEM Conference in Odense in September 2019, and originally in an earlier version at the WERA World Congress in Cape Town in August 2018.

institutions, and is therefore taken for granted and hegemonic. In this sense, the white(est) positions in any given context remain invisible, while less white and non-white bodies/subjects who also inhabit the white spaces, according to Ahmed (2007, p. 159), are "made invisible when we see spaces as being white, at the same time as they become hypervisible when they do not pass" unnoticed.

More often, a corresponding cultural-national dimension has been discussed in previous (Swedish) textbook studies. Carlson & Kanci (2017) show both differences and similarities in the way ethnicity and gender interact to form notions of citizenship and nationality in Swedish and Turkish textbooks. Their results show how national ideals are not only stereotypical, but also rather complex intersectional constructions of co-existing traditional and newer patterns. Similar patterns are also shown in other (Swedish) studies or evaluations (e.g. Swedish Schools Inspectorate 2011; Eilard 2008). In addition, Swedish textbooks have often been characterised as ethno- or Eurocentric, as (positive) representations in them have generally been connoted with typical Swedish/Western appearances or values. Gruber & Rabo (2014) show how this also concerns religion. They have analysed depictions of Christianity, Islam and Judaism in three frequently used textbooks for secondary schools, published in 2008 and 2012. The books are categorised as pluralistic, according to Gruber & Rabo, as the religions are described respectfully and without prejudice, but still as Eurocentric, as they reflect the curricula and policies behind it.

The ethno-national dimension is framed by subtle traces of (banal) nationalism (Billig 1995) that for instance appear in names, flags and/or scenery, as in some of the textbooks evaluated by the Swedish Schools Inspectorate (2011). With such representations, the reader is symbolically positioned within a certain geographical (ethno-national) space that describes the world from this specific viewpoint. From such a position the reader is sometimes further propelled into a post-colonial hierarchy, as shown in for example Eilard (2008), and which is similarly linked to culture-specific values when proximity is contrasted to distance. "Here-and-now" represents the well-known space while distant spaces, "there-and-then", become exoticised or primitivised. Mikander (2016) draws on this dimension in her analyses of Finnish textbooks for primary and secondary schools in geography, history and social studies, published in 2005–10. So does Elisabeth Oxfeldt (2011) when she discusses foreign representations in Nordic textbooks that shed light on the interplay between the global and local. Mikander draws on Stuart Hall's (1992) work "The West and the rest" to show how the hegemony of the West is constructed and maintained in the analysed textbooks. According to Mikander, the West is normally depicted as superior, while other people may be portrayed as threats against the West. When old national stereotypes, according to Mikander, gradually disappear from textbooks, the West is still depicted as superior, by means of new narrative techniques that instead stress certain positive values such as democracy and human rights, while violence/mistakes carried out by the West are left out (Mikander 2016).

All categorisation obviously and inevitably links to different (cultural) values and (chains of) association. Ethnicity, for instance, can be used as a way of differentiating people in terms of "us and them" based on a categorisation formed by culture and language, which has been preferred in Sweden and other Nordic countries. Race, comparatively, is rather a category that constructs and distinguishes appearances, as for instance skin or hair colour, which has been used in Anglo-Saxon countries, or in a sociocultural sense similar to how ethnicity is used in

Scandinavia. The function and consequences of such categorisation, however, will be the same, whether the differences are seen as cultural (ethnicity, religion) or biological (race). With regard to the multimodality of the textbooks I would say this makes Knudsen's (2016; 2009) ethno-race an appropriate category that can be used to highlight both that connection and the differences, in order to understand how subtle racial patterns operate on a structural level and can therefore, even unintentionally, be reproduced in textbooks.

Testing the previous findings

The previous study with foundation in the material originally evaluated by the Schools Inspectorate (2011) that was re-analysed by Eilard (2019; 2018) reconfirmed the ethno- or Eurocentric perspective of earlier textbooks/textbook studies. In particular, numerous illustrations that were categorised as white hands and other parts of white bodies reoccur throughout the textbook material. The hands can be considered as specific for the particular textbook genre or context of natural sciences, since they seem to be used to highlight, or explain things mentioned in the textbooks that refer to chemistry of daily life, or steps of laboratory exercises that were included in the analysed textbooks.

/…/yet at first glance they [the hands] can pass unnoticed. They are just there, embedded in the textbook illustrations, as an underlying or background structure, of the kind that Ahmed refers to in her discussion of institutionalised whiteness. These representations can be seen as unintentional expressions of a deeply rooted – unconscious but at the same time taken-for-granted – white/Western structure that on a symbolic level cuts across the textbooks. (Eilard 2018, p 134)

Method and material

Discourse analysis is frequently used to analyse official texts, for instance news media and schoolbooks, in order to make visible how they are founded in certain values and relations that are embedded in expressions and categories of language. Thus, empirical data has been collected primarily by reading the textbooks, first literally, and then through applying a discourse analytical reading. The basis is a critical multimodal discourse analysis that was developed in Eilard (2008). The textbooks have been regarded as multimodal documents, where text and illustrations are seen and analysed according to the same principles, as a whole. Thus, results presented in the next section regard the illustrations no less than the text. At the same time, it is necessary to keep in mind that illustrations showing people in the chemistry books are rather sparse and sporadic.

The textbooks used in this present study are later editions of three of the natural science/ chemistry books that were included in the original evaluation conducted by the Swedish Schools Inspectorate (2011) in years 4–5 of 14 Swedish primary schools. A total of 12 textbooks, published 1990–2005, were included. Eight of them were later re-scrutinised in the study by Eilard (2018, 2019).

I name the three books in this study book 1, 2 and 3 according to the following categorisation:

Book1: *The Book about Physics and Chemistry* (Persson 2015), for years 4–6

Book 2: *Puls' Physics and Chemistry* (Sjöberg & Öberg 2011), for years 4–6

Book 3: *Spectrum Chemistry* (Nettelblad & Nettelblad 2013), for years 7–9

In discourse analysis, the text content is related to different levels of the contemporary context. As the time span in this case corresponds with the period in which populism and anti-democratic movements have arisen, the earlier described theoretical concepts of multiculturalism, whiteness and (ethno-)race have been used (eg. Ahmed 2007; Knudsen 2016, 2009). The text(books) are also considered in intertextual relation to other (con)texts, such as the national curriculum, news media, other textbooks and current textbook research, as well as sociological research on race and multiculturalism.

Following the above-mentioned principles of multimodal texts, I first read each of the three analysed textbooks literally and with attention to patterns and ruptures within the texts and in relation to the illustrations. In the next step, I studied the textbooks in relation to each other and the previous study, and to other earlier textbooks/textbook studies and the theories presented in earlier sections, even including the curriculum. Finally, the textbooks have been studied in the light of discourses in general that are part of present society, for example as reflected through news media or sociological research.

Results

In this section, the most important patterns of the findings in each of the three chemistry textbooks/editions of later dates are described and discussed, compared to the previous study that was implicitly being tested.

Reproduction of an ethno-Euro-racial structure

Book 3 has obviously been thoroughly revised, but even so, it mainly reproduces the content of the earlier edition. Throughout the book there are more than 50 distinct illustrations, mainly photographs of individuals or body parts that depict chemistry in daily life, all with a seemingly white hue. About 30 of them can be characterised as hands. Further, another 10 illustrations show people (including three hands) of other origin. However, only one is a positive representation: a photograph of two female medical analysts wearing headscarves. The other 9 pictures of non-white people are linked to negative values or phenomena, such as pollution, illness, primitivism or poverty/starvation. This is in line with Mikander´s (2016) findings, where the West mainly is depicted through positive ideals, while opposite negative connotations are overrepresented vis-à-vis non-Western cultures/people. A recurring illustration in book 3 (that has not been counted above) is a photograph of four young people, which seems to have the function of encouraging the reader to reflect after each chapter. There are two versions of the illustration, each repeated six times throughout the book. Both depict two girls and boys, both pale-skinned, if yet

a few with darker hair. At first glance, these illustrations altogether seem to depict a diverse and nuanced mix of humans. Then, however, it becomes obvious that someone has been excluded, as everyone mainly looks Scandinavian, West or South European. Thus, the illustrations confirm and reinforce the imprint of whiteness and white (Eurocentric) ethno-racial structure. Diversity in this book seems to be limited to European diversity.

In addition, there is also a third similar picture, only shown once, depicting four different pale-skinned young people, two girls and boys. This picture more explicitly emphasises biological connotations, as it serves as an illustration to a chapter with the heading "DNA determines how you look. Are you a guy or a girl? Do you have light or dark hair, brown, blue or green eyes? It depends on your DNA!" (Nettelblad & Nettelblad 2013, p. 130).

In line with Carlson & Kanci (2017), book 3 shows – as did the original evaluation – the competitive interaction of old and new discourses, creating contradictions and complexity of representation, when for instance stereotypes mix with more subtle and nuanced depictions. The imprint of whiteness is in other ways enhanced by findings in the two chemistry books described in next section.

Representation of diversity on white conditions

Book 2 seems to be the most revised of the three in accordance with a possible interpretation of the curriculum from 2011. Book 1 on the other hand has been least changed compared to the earlier edition. Mainly it is the same book as was analysed in the previous study (Eilard 2019, 2018) with only a few newly added pages. As in book 3, the illustrations in both remaining books (1, 2) are a mix of drawings and photographs, but in contrast to book 3, where the photographs were most noticeable, drawings dominate in these books.

The core of book 2 is the same as in the previous edition. The reader is encouraged to engage actively in the text, in the way a detective solves problems, and in order to learn to think scientifically. In the previous edition, the main characters were a boy and a girl, while in the latest edition a third character has also been added, the dimension of ethno-race. There is now a boy and girl with fair skin (Sarah and Ludvig) and a seemingly androgynous character with darker skin and hair, called Ravi. If you are not familiar with the name, the character could just as well be counted as a girl. This can be compared to a nameless androgynous character in book 1, who is identical in both editions, and who was thoroughly analysed in Eilard (2019, 2018) and was described as an open and inclusive construction. The same goes for Ravi in book 2. However, when looking more thoroughly into book 1 again, I found that the number of (positive) diverse representations (including a couple of hands) are not that many after all (roughly 11/2 hands). The white representations (including some hands) were considerably more (roughly 75/9 hands).[25] For example throughout book 1 there are several instances, showing the history of Natural Science, where whiteness appears in the representation of white (male) scientists. The importance of not only counting

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[25] This is a rough estimate, where I counted the numbers of illustrations not individuals, which would have increased the number of white representations even more. However, in a couple of cases it was for different reasons difficult to distinguish whether the representations were white or non-white. In those cases, I counted the illustrations as non-white or not at all, as there was nevertheless more white representation. In a few instances, there were both white and coloured figures in the same illustration. In those cases, I counted them twice, as both white and non-white, unless there was a distinct majority for one or the other.

representations, but also assessing qualitative aspects in relation to the quantitative, was stressed in the previous studies. An example of this in the present study is the three characters in book 2, who before counting, seemed to be evenly represented throughout the book. However, Sarah is depicted about two fifths as many times as Ludvig (45/26) and about one-fifth more times than Ravi (45/36). Thus, altogether, the white characters (Sarah and Ludvig) are shown twice as often as the coloured (Ravi).

Fifteen photographs in book 2 show white people or parts of white bodies including hands in half of the instances. Even if whiteness is not as noticeable in book 2 as in book 3, it is intensified by the intertextual effect, when the books are analysed together. There is also a couple of distinct cartoon hands in book 2. One of them is white, while the other is dark and quite possibly belongs to Ravi (p. 105, 121). This darker hand demonstrates an experiment, on a fairly small and marginal picture, that in the previous edition was demonstrated on a full page by a white hand (cf Eilard, 2019, p. 45; 2018, p. 128). Thus, the intertextual interaction between different levels of meaning is made visible, as a political correct adaption, according to the curriculum, that however fails, as the size of the representation seems to have diminished when it was turned into a representation of "the other". The post-colonial scholar Andreotti (in Stein & Andreotti 2017) has repeatedly highlighted the risk of trivialised, symbolic violence as an unintentional but counterproductive pedagogic effect.

On the new pages in the later edition of book 1, there is on one occasion a small and quite marginal drawing showing three boys bouncing balls of different sizes. First, there is a tall boy with light brown/reddish hair, playing with something that could be a basketball. Next to him is a shorter Asian-looking boy, with a black hair tassel on the middle of his head, bouncing something that looks like a golf or ping pong ball. Finally, there is a little black boy bouncing a tennis ball. Through the intertextuality, these pictures can be linked to colonial stereotypes of Asians and Africans in textbooks from the 1950s –60s (cf. Eilard 2008). In relation to each other and the historic intertextuality in the way they are depicted, they could almost be characterised as racial stereotypes. In comparison to Billig's (1995) concept of banal nationalism, this exemplifies the comparable phenomenon of everyday racism (Essed 2005), which functions in a similar way, and which is being concealed and reproduced at the same time through subtle and very trivial signs in everyday language.

There seems to be a special effect when the three books are read and interpreted together, which is constructed by the repeated readings of intertextual dialectical contrasts of different texts and contexts. The individuals that were missing in the depictions of the four young people in book 3, in order to make them correspond to global diversity, instead happen to turn up in another of the three analysed books. Among depictions of seemingly nuanced diversity two stereotypical individuals from outside Europe turn up as survivors of old colonial discourses, and therefore also in another way confirm this white structure as a leftover trace from the past.

To conclude, books 1 and 2 show the same phenomenon as book 3, but in a reversed way, as the use of diversity here has become a confirmation of whiteness in the way that Ahmed (2007) describes happens when diversity is used on white conditions.

Conclusion

When looking back at the research questions, the short answer is, yes, the results of this study are in line with the findings of the previous study. The three textbooks included in this study comprise representations founded in semiotics that in different ways confirm the white (ethno-racial) structure that was elucidated in earlier studies. The purpose was both to gain a deeper understanding of those previous findings and to test them out, not in any way to value or criticise the textbooks as such, nor their authors. Thus, this contribution should be viewed as a critical analysis based in patterns that – more or less involuntarily – are expressed in these textbooks, when they are intertextually compared to older textbook editions. Consequently, the underlying white structure (cf. Ahmed 2007) that was in this case shown not least in numerous depictions of white hands in the chemistry textbooks, does not seem to be an exception. I honestly was surprised to find it and also such a clear imprint of whiteness in these later editions. Moreover, it was just as surprising to find the colonial stereotypes here, with the white hands. It is important, however, also to bear in mind that overall, the numbers of individuals depicted in the textbooks are rather sparse.

Although the examples here are mainly from Swedish textbooks and the results can also be regarded as specific for the textbook genre in question, the discourses that materialise in textbooks and have been made visible here, are also parts of the surrounding society on a wider level. Textbook representations are for instance linked to the ongoing identity-political debate (see eg. Eilard in press, 2018; Gruber & Rabo 2014; Oxfeldt 2011) which has been nourished throughout the neo-liberal era. In this study, for example, it appears how even intentional politically correct representations are challenged by the white structure.

Drawing on Ahmed (2007), the whiteness of the textbooks could be described as an invisible underlying structure. Drawing further on Billig (1995) and Essed (2005), even marginal symbols and wordings embedded in subtle discursive signs and semiotics in everyday language, may mutually nourish underlying cultural patterns of thought, producing and reproducing bias and attitudes, including the colonial and the racial (Nicolson, Andreotti & Fortune Mafi 2016). In order to make visible such patterns and attitudes, which could risk being quite harmful, if reproduced – even unintentionally – for instance in school, it is crucial to pay attention to blind spots or perspectives that are taken for granted, for example in school textbooks and everyday communication (Stein & Andreotti 2017). Eventually, this study shows how

textbook analyses could shed light on and help us contemplate such aspects of social reality that in everyday life are viewed through a veil of contemporary blindness.

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Christianity and the Lotus

Dealing with Buddhism in Belgian Catholic Religion Education before and after Vatican II. A Case Study Starting from the Analysis of Religion Textbooks for Secondary Education (1870-1970)

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Introduction

In this paper, which starts from an analysis of Belgian Catholic religion textbooks for secondary education, from 1870 up to 1970, I explore the image of Buddhism in such textbooks before and after Vatican II (1962–65). In doing so, I will make use of a descriptive hermeneutic content analysis wherein, firstly, I investigate how Buddhism is represented in the textbooks as creed, code, community and cult. Secondly, and related to this, I try to determine the underlying theological paradigm that has formatted this image. For that, I make an appeal to a number of contemporary theological constructs, such as 'inclusivism' and 'exclusivism', which I believe lend themselves very well to the detection of the Catholic Church's interreligious and intercultural positioning in education (Van Wiele, 2011). Although somewhat different meanings for these concepts are given in the scholarly literature, I think one can fit these two 'sensitising concepts' into the following working definition. By 'inclusivism' I refer to the theological model in which it is recognised that other religions may possibly possess partial truth and a certain possibility of salvation, on the condition that Jesus Christ functions as the norm and constitutive element of such truth and salvation. By 'exclusivism' I mean the theological model that sees Christianity as holding the exclusive monopoly on truth and salvation (Van Wiele, 2004). By employing these comprehensive and unifying theological concepts in the textbook analysis, I hope to make a modest contribution to the history of the theology of religions in Belgian Catholic education and the Catholic Church itself for the period under investigation (Van Wiele, 2014a). In the contemporary educational and theological literature, one finds that a majority of authors are of the opinion that the dominant interreligious paradigm in the Catholic Church and education prior to Vatican II was 'exclusivist' in nature and became 'inclusivist' after Vatican II (Hick, 1988, 1995; Klages, 1977; Knitter, 1995; Merrigan, 2007). A minority, on the other hand, holds that 'inclusivism' was the dominant paradigm within the Catholic Church and

its education during the whole period under investigation (D'Costa, 1990; Panikkar, 1988). With my analysis, I aim to lend greater weight to one of these two positions, at least as far as Belgium is concerned. As far as the period before 1950 is concerned, the source material is restricted to textbooks of apologetics. One simple reason can be cited for this: in the corpus of religion textbooks used in secondary education, they alone make explicit statements concerning Buddhism. This kind of religion textbook disappeared around 1950 in Belgian religion education as a separate kind of religion textbook (besides church history textbooks, textbooks on biblical history and 'devotional history', and 'little' catechisms)[26] and were then replaced by more broad, general and unified religion textbooks, wherein more can be found concerning non-Christian religions and which therefore form the corpus of the source material after 1950 (Van Wiele, 2007).

Why do I base this research on textbooks (Van Wiele, 2008, 2011, 2014b)? Because textbooks are considered to be part of the micropedagogical level, which itself is a blend of networks and structures finding their origin on macro- and mesopedagogical levels (policy guidelines from governmental and educational bodies, prevailing pedagogical and ideological goals, etc) of an entire educational system (Depaepe & Simon, 2003). If, besides, in line with certain trends in educational historiography (Depaepe, 2006, 2008, 2010a, 2010b), one defines an educational system as a 'school culture', more specifically as an entirety of values, norms, and expectations that determines the identity of a school and the activities of its members (Kelty, 2000), then it is self-evident that the textbook, as the 'intersection' of an entire 'school culture' (Tyack & Tobin, 1994), is a privileged source for finding the large 'structures' or mentalities and identities that constitute a 'school culture'. In this way, with the religious textbook as a central source, I want to trace some of the large structures of the 'grammar of schooling' that provided the format for Catholic interreligious and intercultural education in Belgium in the past.

Main results

When we take a closer look at the Belgian textbooks for the entire period under investigation, we first of all notice a great deal of continuity. Buddhism is approached from a Christian 'inclusivist' theology of religions in which Christianity is seen as the religion that possesses the 'fullness' of truth and that represents the normal salvific path. Buddhism, like the other major non-Christian religions, displays many truthful and noble elements, but to a lesser extent than Christianity. Nevertheless, there is definitely discontinuity as well, more specifically with Vatican II (1962–65) as a tipping point. For, around the time of this Ecumenical Council and in the years that follow, the textbooks gradually reveal a tendency to put

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[26] See for a catalogue of the available Belgian textbooks: Depaepe, D'Hoker, Simon, 2003.

more emphasis on dialogue and what unites Buddhism with Christianity, rather than on what distinguishes these religions from one another, although the textbooks continue to build on fundamentally the same theological 'inclusive' principles as before. In order to gain a better insight into the constants and evolutions, I divide the period under investigation into a sub-period before Vatican II (1870–1950) and a sub-period during and after Vatican II (1950–70). For each of these sub-periods, I discuss a number of concise text fragments from the textbooks and explain them further in light of the historical and societal context.

Buddhism as a Dark Mirror of Christianity

In the period occurring between 1870 and 1950, in spite of the underlying 'inclusivist' paradigm, the image of Buddhism in the textbooks is predominantly negative. This is primarily due to the fact that Buddhism in this period was only discussed in the so-called 'apologetic' textbooks, intended for religious education in the higher years of secondary education. A classic aspect of this apologetic approach is the desire to show the truthfulness of Christianity in response to external attacks. Although, historically considered, 'apologetic' approaches of the Christian faith are as old as Christianity itself (Dulles, 1971), the type we find in the textbooks of the 19th and first half of the 20th century is 'contextualised' (Van Wiele, 2011). Unlike the Christian apologists active in the first centuries of Christianity, who wanted to defend the truth claims of the Christian religion against 'pagan' and Jewish schools of thought, the textbook authors of this period now go on the defensive in order to counter some of the rationalistic and naturalistic currents of the time, which arose from Enlightenment thinking and which are labelled as a general 'modernism' in the textbooks (Berger, 1999; Graf, 1998; Hill, 2002, Ladous, 2000; Schneider, 1998; Talar, 1999). On this basis, the textbook authors react in particular against certain trends in the comparative science of religion (Sharpe, 1994) that was on the rise at the time. Specifically, they opposed the trend to relativise the uniqueness of Christianity on the basis of confirmed or presumed parallels between Christianity and other religions (Cabanel, 1994; Cracknell, 1995; Kenis & van der Wall, 2010), especially Buddhism, by characterising all religions as fundamentally equal and parallel truth systems and salvific paths, which only appear to differ from one another because of culturally determined differences and externalisations. The consequence of such an apologetic and polemical approach is that during the presentation of Buddhism, the emphasis is placed on differences rather than on similarities with Christianity. This apologetic approach was very much present in the official Catholic Belgian, German and French church histories and dogmatic treatises (e.g. Von Schanz, 1891, Wilbois, 1948[2]) that surrounded the Belgian religion textbooks. These treatises were in turn based on an an apologetic reading of more scientific overviews of Buddhism (e.g. De Harlez, 1894; Rhys Davids, 1914).

There is also a missionary factor. In the 19th and early 20th century, many European – and also Belgian – Catholic congregations were active in Buddhist regions in Asia, including China, Korea, Tibet and Vietnam, where they proclaimed the Christian faith by providing health care and education (e.g. De Letter, 1932). During this period, certain variants of Buddhism manifested themselves in these areas as dangerous competitors of Christianity, sometimes even by violently threatening the local Christian population. One example is the so-called 'Boxer Rebellion' in China in 1900, in which tens of thousands of mainly indigenous Chinese Christians were killed in response to a perceived threat, real or not, posed by Christianity and/or 'the West' against traditional Chinese Buddhist and Confucian views on politics, economy, religion, etc. I cannot deal here with the discussion of whether Christianity and the West are to be blamed for these kinds of upheavals, but what counts here is that detailed accounts of this massacre were given in the Belgian missionary magazines and brochures of the time (e.g. De Schaepdryver, 1927), and the impact of this event on religious education – which in Belgium was often provided by the missionary congregations – should not be underestimated. It could easily result in an image of Buddhism in the textbooks that was not very positive.

On this apologetic, anti-modernist and missionary basis, the textbook authors present an image of Buddhism that above all makes clear what they consider to be the radical differences with Christianity in terms of religious doctrine, morality and religious rites. Nevertheless, the underlying theological paradigm remains 'inclusivist', since it is still recognised that Buddhism and other religions possess a grain of truth (e.g. Berquin, 1942; Frutsaert, 1931[4]; Lambrecht, 1883; Minnaers, 1924[3]; Rutten, 1897[2]; Verhelst, 1915, 1918). I will give a very few concise examples from their varied assortment of views: in terms of religious *doctrine*, Buddhism does not actually provide a well-defined set of beliefs, in a manner that is incompatible with Christianity (Van Brabant & Stock, 1942). Another incompatibility is on the level of doctrine that is indicated: ancestral Buddhism does not actually mention the existence of a God or the existence of an immortal soul (e.g. Legrand, 1929[2]). In the domain of *morality*, too, the authors mainly identify problematic inconsistencies with Christianity: Christianity seeks to extinguish all wicked passions and desires, to cultivate good passions, and stresses the importance of being actively involved in the world. Buddhism, on the other hand, again according to the textbook authors, wants to literally extinguish all passions – including the good ones – which leads to passivity, indifference, and resignation (e.g. Valvekens, 1909). Besides providing a list of irreducible differences, the textbook authors occasionally – and to a lesser extent – also underline some similarities with Christianity. I name just a few. One author praises the peacefulness of Buddhism because, similarly to Christianity and unlike Islam, whose missionary activity was carried out with the sword, the missionary work of Buddhism took place peacefully and swiftly on the basis of the persuasiveness of its preachers (Valvekens, 1909). Another

author underlines, as a positive parallel between Buddhism and Christianity, how serious consideration is given to all forms of suffering faced by man (Legrand, 1929[2]). Both authors also refer – with or without the help of additional examples – to the pursuit of very noble virtues in both religions, such as detachment from the earthly, chastity, gentleness, condemnation of hatred and anger, the prohibition on killing, contemplation, the search for wisdom, etc.

Buddhism as partner in dialogue with Christianity

Around the time of Vatican II, the treatment of Buddhism in the textbooks undergoes a number of changes, without, however, losing the 'inclusivist' theological principles from the previous period. First of all, the approach becomes less apologetic (Van Wiele, 2016). The textbook authors no longer present Buddhism with the sole purpose of proving the superiority of Christianity, but generally begin their discussion of this religion with a brief and less evaluative *science-of-religion-based* overview of its origins, main religious representations, and ethical, ritual and societal aspects. As in the previous period, Buddhism is discussed mainly in the textbooks written for the highest years of Belgian secondary education of that time frame. Unlike in the previous period, however, this is no longer done in separate 'apologetic' textbooks – this type of textbook went out of fashion in Belgian religious education in the 1950s – but in more 'global' textbooks that are in line with 'modern' theological attitudes, using an approach inspired by the so-called *nouvelle théologie* (Routhier, Roy, Schelkens, 2011; Villanova, 1997), where the focus is more on contemporary life problems and whereby answers taken from the Gospel are discussed. Secondly, the parallels between Buddhism and Christianity now receive more attention, which, together with a less apologetic approach, leads to a more positive image of Buddhism. This is done without glossing over incongruities, however. More than in the previous period, both religions are now presented as the result of the human search for answers to the larger questions of life, yet the norm for religious truth remains Christianity. Because of all the truthful and virtuous elements in Buddhism, this religion is now put more in the spotlight not only as a *praeparatio evangelii* – a stepping stone for understanding and embracing the 'fullness' of the Christian truth (Bea, 1967), but also as a partner in dialogue in order to establish a peaceful world. Here also, the textbook authors were not very original and their succinct notions on Buddhism can easily traced back to surrounding Catholic theologians dealing with Buddhism (e.g. de Lubac, 1952, van Straelen, 1966), who based themselves more and more on insights of the emerging field of scientific Buddhist studies (e.g. Conze, 1951; Lamotte, 1958), insights which were also available at that time in more popularising scientific literature in Belgium (e.g. Neil, 1964; Ringgren & Ström, 1963).

Nevertheless, an internal evolution that takes place in the period 1950–70, with Vatican II as a tipping point. Up until the beginning of Vatican II (1962), the inclination was to put more emphasis on what distinguishes Buddhism and Christianity from each other (e.g. Peytier, 1954, 1958; Toussaint, 1953; van Caster, 1950, 1961). Concretely, this was done through an evaluation of Buddhism at the end of a brief and more neutral presentation of this religion in terms of its religious representations, ethics, and ritual and societal aspects, in which the authors of textbooks generally brought up a number of controversial issues in the dialogue with Christianity. It is only during and after Vatican II (1962–65), in line with the authoritative texts promulgated during this ecumenical council (Alberigo & Komonchak, 1995, 2006; Lamberigts & Declerck, 2006; Roy, 2012), that we fully see an approach emerge to put more emphasis on what unites Buddhism with Christianity, and a tendency to take this as the starting point in the textbooks (e.g. Dewandel & Dejonge, 1967, 1968; Hendrickx, 1968; Van Alphen, 1966), which immediately makes the content less negative. A few excerpts from the textbooks can illustrate this evolution.

In the period before Vatican II, the textbook *Christ in Our World* (1961) – written by the Jesuit Marcel van Caster, and intended for religious education in the highest years of Belgian secondary education – contains a chapter on non-Christian religions that begins with Buddhism. Van Caster first lists, based on religious studies insights that were already generally accepted and known at the time, the most important biographical data on the founder of Buddhism, Siddhartha Gautama, later called the 'Buddha' (meaning 'the enlightened one'), insofar as the historical facts can be distinguished from myth formation regarding this person. The biographical data given by van Caster are clearly meant to play a part in demonstrating the fundamental religious insights of the Buddha. We read how Siddhartha, as a prince, supposedly led a life full of earthly pleasures until the moment when, through contact with an old man, a sick man and a corpse, he came to the insight that life is not always joyful. It is then noted that Siddhartha left the palace and withdrew into seclusion, until he reached 'enlightenment', and came to the conclusion that all life is suffering, that suffering is caused by cravings and desire, and that this suffering can only be stopped by separating oneself from all earthly pleasures through contemplation and gentleness, in order to enter Nirvana. Next, the textbook author briefly touches upon a fact that is important for the dialogue with Christianity: the Buddha does not actually deny the existence of God, and his teaching – in practice – amounts to a moral doctrine without religion.

Particularly indicative of van Caster's attitude, however, is his evaluation of Buddhism at the end of his presentation. The key point of his assessment is that although Buddhism displays many noble elements, it remains too negative. Van Caster lists several elements to prove this. For example, Buddhism knows 'no redemption from sin; because it seeks only deliverance from suffering'. Moreover, Buddhist solidarity

is actually marked by pessimism: 'helping others to rid themselves of all suffering and, to this end, of all desires'. In his view, the doctrine of Nirvana *is meagre as well*: 'nothing positive is known about it; all we are told is that we will no longer be plagued by unhappiness there' (p. 232). Van Caster then contrasts these weaknesses of Buddhism with the 'fullness' of revelation in Christianity, in which a fully positive realisation of life can be found that offers the true path to deliverance from inadequacies and suffering – a salvific path in which Buddhism can find its completion, as it were. To substantiate this point he argues, among other things, that in Christianity, too, suffering can be meaningful – as well as redemptive – when it is experienced and borne after the example of, and in union with, Christ. Without much further explanation, he adds that this demeanour makes love, in its richest form, possible, which 'sets us on the path to eternal positive happiness in union with God' (ibid.). By the latter, he possibly means that the Christian understanding of salvation, which ultimately consists in the perpetual blissful beholding of God, should not be expressed solely in negative terms, as is usually the case with Nirvana in Buddhism, which subsequently leaves no more room for any sort of joy or happiness.

The way in which the Jesuit Herman Hendrickx presents Buddhism, is representative of the partially different approach in the second part of this period, namely between 1962 and 1970. Even more emphasis is put here on similarities between Christianity and Buddhism in order to facilitate interreligious dialogue and mutual understanding, as was outlined by *Nostra aetate*, the Second Vatican Council's document on the relationship between Christianity and non-Christian religions. Hendrickx starts from a positive attitude by pointing out the double attraction of Buddhism for Christians: 'As a result of the doctrine of non-violence ... nearly all ... Buddhists ... are practical pacifists. They have no caste system and accept the fundamental equality of all human beings. This is why, in today's world, Buddhism can with a certain right present itself as the gospel of peace. A second reason ... is its down-to-earth, practical mindset'. This is followed by a number of pages dedicated to a more systematic science-of-religion-based introduction to Buddhism and its variants, in which the author nevertheless makes clear to the pupils – through a list of mainly similarities but also differences – how Buddhism points in the direction of Christianity, in which this Eastern religion can find its completion.

I offer a few examples: on the one hand, Hendrickx, by means of examples, gives a positive evaluation of original Buddhism as a reform of Brahmanism in which the Buddha turned away from polytheism, the complicated ceremonies of the Brahmins and the exaggerations of the Hindu ascetics. Yet at the same time the author states that the teachings of the Buddha are aristocratic – a doctrine for monks who withdrew into solitary meditation. He further characterises the famous doctrine of the Four Noble Truths as an 'impressive set of moral and psychological precepts, designed to help man to free himself from desire', and in which benevolence occupies a prominent position. He adds, however, that this is a

benevolence 'without love, for this love is already a form of desire and thus a source of suffering'. In addition, when talking about compatibilities with Christianity, Hendrickx lists some developments within Mahayana Buddhism, such as the emergence of the concept of charity through the figure of the bodhisattva, the 'enlightened one' who, out of compassion for others, postpones his entry into Nirvana; and the development of the idea of God through the figure of the celestial bodhisattva, to whom one prays for salvation.

Conclusion

During the period between 1870 and 1970, contrary to what might be expected from the majority of authors, the dominant interreligious paradigm underlying the representation of Buddhism turned out to be mostly 'inclusivist' instead of 'exclusivist' in nature. This opposes the view that 'exclusivism' was predominant within the Catholic Church and its education prior to Vatican II. This does not mean that there is no discontinuity: before Vatican II the focus in the textbooks is on the differences between Christianity and Buddhism, while around and after Vatican II there is a clear tendency towards emphasising the compatibilities and parallels between both religions.

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Renewing teaching resources by nurturing human networks: an analysis of a design teachers' network

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Abstract

Design teachers practice environmental scanning to renew their resources to keep their design culture up to date and in line with contemporary and societal changes and evolving design professional practices. Design teachers use these resources during conception of the design brief[29] and support of students' creative work. In this paper, we focus on a key part of teachers' scanning process that involves building and maintaining human networks and relationships. We propose a model of environment segmentation and analyze the structure and fields of design teachers' networks and the types of resources to which they gives access. Our results present the human-based network renewal modalities and their huge importance. We show that the network, both internal and external, enables teachers to reach complementary, grey and fresh resources, counterpoints, and professional skills that help them to stay up to date throughout their careers.

Keywords

Environmental scanning, Teaching resource, Human network

Context and problem

This contribution[27] studies how human-based *environmental scanning* (or strategic monitoring) may contribute to design teachers' acquisition of teaching resources in higher education. This work explores, for design teaching, the results achieved by ReVEA (French National Research Agency project, 2017), which affirm that the human-based network is an important part of resource management.

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[27] That Is part of a Ph.D dissertation

We work on a key part of teachers' scanning process that involves building and maintaining human networks and relationships. This activity can provide teachers with updated resources coming from different areas and environments and expand their emergent resources.

Environmental scanning (Morrison, 1992) is the activity of scanning the external environment to identify new trends, signals and change patterns to forecast the future. It is an important activity for design teachers because they must keep their design culture up to date in line with contemporary and societal changes as well as evolving design professional practices (Julier, 2014). Teachers use environmental scanning to renew their resources to create new design projects, to nourish contributions and feedback during practical lessons, and to seek out partners for workshops.

We consider that resources are "[…] entities, which may be tangible or intangible, on which teachers rely on for their teaching practice, whether it concerns the preparation of courses (design of the brief for example) and/or the exchange with students (critical phase). […]. Tangible resources include digital resources, they are grains that include products, visuals, videos, documents, while intangible resources include information exchanged" (Roumy Akue, 2019, p.329).

We first explain environmental scanning and its different levels, then present the characteristics of human-based network, and finally present our qualitative analysis based on semi-structured interviews of our sample of fourteen design teachers who come from different design fields and schools. Our results show how design teachers use their human network and the importance of this network in acquiring emergent trends and professional expertise.

Conceptual framework

In this section, we build our conceptual framework to analyze the design teachers' human-based network and its environment. We first qualify the segments that make up the environment and the levels of granularity of the monitoring by addressing the different levels, macro, mezzo and micro. We then define the characteristics of the human-based network.

The scanning environment

The scanning environment is the area in which relevant resources can be identified and extracted.

To discriminate key parts of the environment, we divide it into internal and external components (Figure 1). The internal environment includes the people who belong to the organization[28] while the external includes other actors. The external environment can be divided into three levels, macro, mezzo, and

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[28] Our conceptual framework is based on management science and defines organizations such as companies or institutions. In our context, the organization represents the educational institution of reference – that is, the school.

micro. The macro level addresses the Political, Economic, Social, Technological, Environmental and Legal (Jain, 1984) – that is, the PESTEL model. The mezzo level includes activity sectors that have a huge influence on the organization (Choo, 1999; Hambrick, 1982; Yoo & Sawyerr, 2014). The micro level includes people who have daily transactions with the organization (Daft et al., 1988). This segmentation enables an analysis of human network characteristics and influences by listing the original fields and frequency of interaction of the human network.
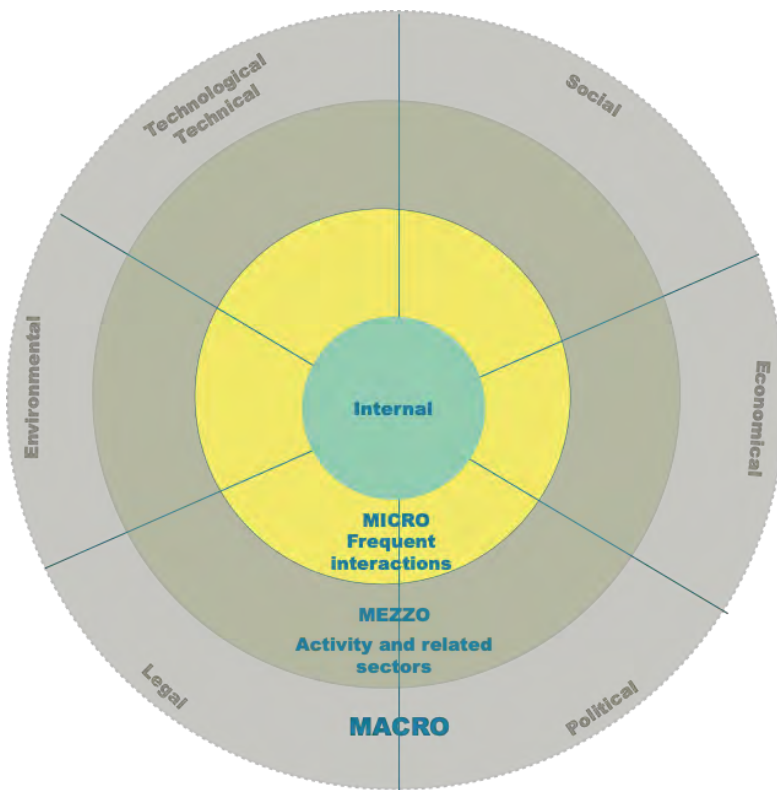
Figure 1: Environmental division for scanning

The human-based network

We consider a human network as "[..] a set of links connecting several individuals and providing different types of exchanges" (Sawyer & al., 2003, p. 270) and networking as an activity during which people connect and share information. Networking is based on relationships of trust and permanence of ties (Dubini & Aldrich, 1991).

Networks facilitate access to information, especially in turbulent environments, and can bring strategic benefits (Franco & al. 2011). They also have a positive impact on innovation (Rogers, 2004).

Dubini and Aldrich (1991) characterize networks by their density and accessibility. Density *"refers to the extent of links between individuals or organizations and is measured by comparing the number of links present with the potential number that would occur if each unit in the network was connected to all other units"*. Accessibility refers to

the greater or lesser possibility of reaching a person in the extended network and a profile within the network that they call a *"broker"*. These brokers are bridge persons who connect people in the network by passing on information and resources (Dubini & Aldrich, 1991, pp. 309-310).

Chollet (2006) identifies three salient dimensions of a personal network: the structure (size of the network), the type of ties, which includes *"frequency of interaction and emotional closeness"*, and the specificity of the people in the network, such as hierarchical connection or location (*ibid.* p. 111). Regarding those points, an analysis of the network structure requires identifying how many outsiders make up a person's network. The analysis of types of ties requires to identify the links that affect the frequency of shares and communications and the nature of the emotional bond within the network. Analysis of the specificity of the people with whom the monitor interacts is a matter of determining their provenance, whether internal to the entity or external, the *"area of expertise"*, or their geographical origin (*Ibid*).

Leitzelman (2010) highlights the possibilities of collaborative network monitoring through a network of lookouts to identify emerging issues. He underlines the importance of network monitoring based on collective intelligence and distributed collaboration, which includes significant human and documentary interactions.

Methodology

To analyze the design teachers' human-based network and to understand the complexity and variability of teaching situations, we opted for a qualitative research and semi-structured interviews.

Using multi-case sampling, we conducted interviews with several individuals in order to achieve diversification (Pirès, 1997) and maximum variation. We selected teachers from three institutions, two of which were design schools and one a university. We wanted to vary teachers' profiles and to reach teachers whose only professional activity is teaching as well as teacher-researchers, teacher-designers and also different fields of design: graphic design, product design, and transdisciplinary design. We also sought to interview teachers with different numbers of years of experience.

We chose teachers working with students close to professional integration at a postgraduate level. The teachers were teaching design projects in design studio courses, but most of them had several graduate levels and were giving other theoretical or practical courses in addition to design studio courses.

To select our sample, we also used intra-site selection parameters. In this case, our sample included teachers who worked together within the institutions involved. We made this choice to take into account cross-fertilization of information and to monitor possible exchanges between teachers during the preparation of topics or the organization of workshops, to better to local interactions and to identify the networks.

Fourteen interviews were conducted with a total duration of 19h43'06". We developed an interview guide that evolved throughout our research and within our theoretical readings. The interview guide was intended to give us some pointers for launching and re-launching. Design courses and student support situations were targeted. More specifically, we analyzed the teaching context, teachers' motivations for resource acquisition and the organizational modes in their networks. For coding, we proceeded by an inductive-hypothetic-deductive loop with a round trip between the data and the conceptual model.

Results

In this section, we first attempt to characterize the network of design teachers and point out the circumstances of interactions. In a second step, we shed light on the modalities of network acquisition and renewal. In a third step, we study the fields of expertise of the source persons. In the fourth step, we analyze the role of internal and external human sources. We finally analyze the human-based network renewal rate.

Human-based network characteristics

Human-based network characteristics are composed of internal and external parts (Figure 2):

- The internal network is composed of teachers, students, and inspectors.
- The external network is composed of external contacts such as friends or researchers, sponsors or partners (for example, the people the teachers interact with during workshops).
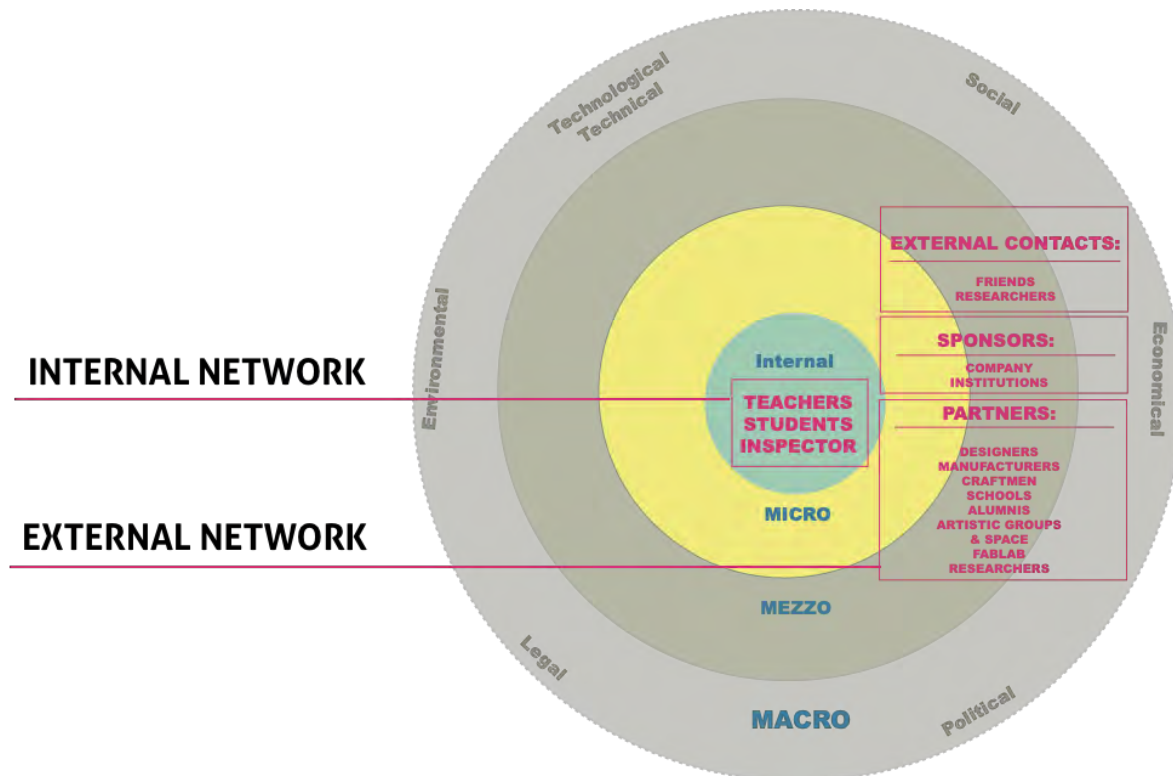
Figure 2: Design teachers human-based network characteristics

Professional and private interaction circumstances

Teachers exchange resources with their internal network especially during the co-design of briefs[29], the co-animation, and the workshop planning.

Regarding their external network, teachers interact during competitions, projects, workshops, conferences and during private time with other contacts who can be friends for example.

Network acquisition method

To acquire the external network, we can see that

- Sometimes design projects come to teachers:

Renaud: "We very, very quickly got the order for the JOB space [...] for an event in November."

- It can be based on the former students' network:

The alumni network has a very important place in the human networks within the training courses. The former students most often intervene in workshops.

Anne says, "They are former students who have a design practice, which I remember they had an orientation that interested us, so sometimes they are called upon."

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[29] The brief is a document, created by the teacher, that gives stages and milestones including creative incentives, time constraints, rendering typology, learning objectives, and evaluation criteria (Orr & Shreeve, 2018).

- It can be via exploration:

Yoann says he was "very intrigued by the redesign of Monoprix's identity". He looked for the designer and "contacted her" for a workshop (Monoprix is a French company in the retail and distribution sector).

A composite network

Our results show that design teachers' networks are composite. We noted the presence of many different profiles: designers, industrialists, craftsmen, artistic groups, different professionals from the arts and crafts, teachers and students of engineering schools, Fablabs[30] actors, researchers, former students and entrepreneurs from different professions such as farmers, pastry chefs or mechanics.

Eleven of the fourteen teachers of our sample who have a strong external network present a composite network, made up of people with different fields of expertise. Teachers interact first with people coming from design, art and technological fields. We show below four design teachers' networks (Figure 3). The dark blue dots show partners interacting with students during design projects, and the light blue dots are external actors interacting only with the teachers during their private time.

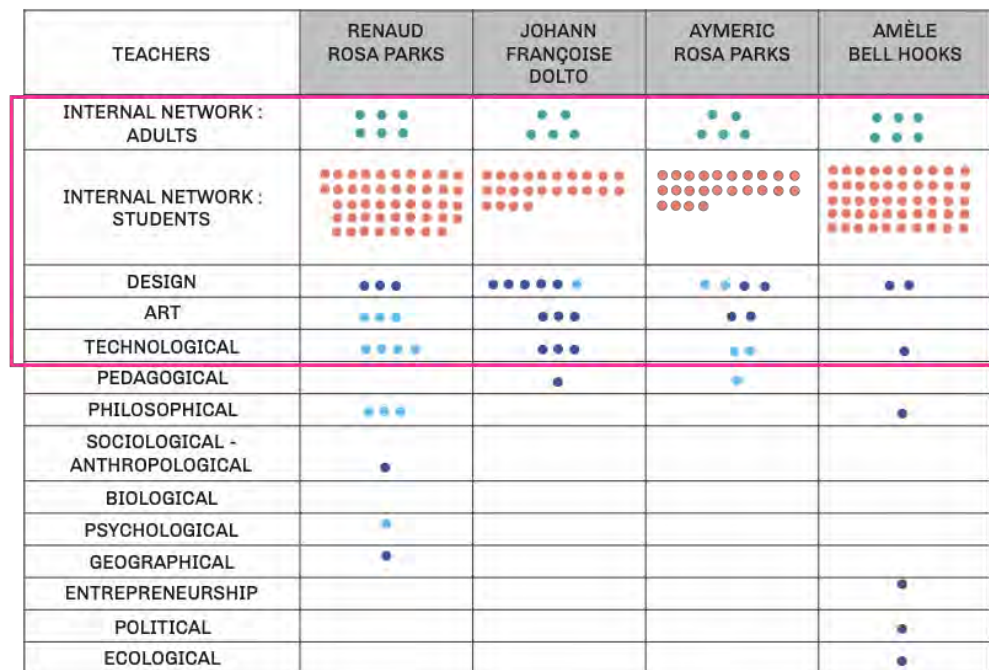| TEACHERS	RENAUD ROSA PARKS	JOHANN FRANÇOISE DOLTO	AYMERIC ROSA PARKS	AMÈLE BELL HOOKS
INTERNAL NETWORK : ADULTS	● ● ● ● ● ●	● ● ● ●	● ● ● ●	● ● ● ● ● ●
INTERNAL NETWORK : STUDENTS	(many)	(many)	(many)	(many)
DESIGN	● ● ●	● ● ● ● ● ●	● ● ● ●	● ●
ART	● ● ●	● ● ●	● ●	
TECHNOLOGICAL	● ● ● ●	● ● ●	● ●	●
PEDAGOGICAL		●	●	
PHILOSOPHICAL	● ● ●			●
SOCIOLOGICAL - ANTHROPOLOGICAL	●			
BIOLOGICAL				
PSYCHOLOGICAL	●			
GEOGRAPHICAL	●			
ENTREPRENEURSHIP				●
POLITICAL				●
ECOLOGICAL				●

● Colleagues
● Students
● Partners
● External actors

Figure 3: Four Design teachers' network composition

Role of the internal human-based network

The internal network assumes several roles.

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[30] A Fablab is a small-scale workshop for digital fabrication.

Except for one teacher of our sample who doesn't work with his colleagues, the others all work more or less frequently with their colleagues in projects, workshops or in co-animation.

- This internal network provides complementary resources. It helps teachers to have other perspectives.

Louise talks of "counterpoint", Lolita of "other point of view".

- It helps teachers to have resources from different field of expertise

Victorine says that she relies on one colleague to update her "multimedia and digital knowledge", on another for "graphic design", and on a third for the "human sciences".

The internal network is also made up of students who bring resources to the teachers. Renaud says, for example, that he "notes down" when students talk about a reference he doesn't know yet.

- The internal human-based network also provides access to a wide area network.

Anne says that she reaches partners, "throught other teachers who have people in their circle".

Amèle says that she relies on Samy [a colleague] who "has a wide network" to invite partners that come "to share their experience".

Role of the external human-based network

The external network also assumes different roles that are complementary to the internal network roles.

- It provides access to grey and fresh resources that are difficult to catch and up-to-date.

Teachers rely on their external networks to access information related to:

Johann: "emerging themes"

Renaud: "innovative devices"

Samy: "how people live, what they do"

Aymeric: "very highly specific information"

- It provides access to professional practices:

Yoann says that working with partners is a way to counterbalance "skills" in which "the pedagogical team is weaker". He says that partners can contribute to "practices", "types of techniques", "types of concerns" and "working methods".

Outsourcing and decentralization processes

The human-based network provides an opportunity to outsource and decentralize environmental scanning for:

- The identification of partners by students:

Yoann: "[..] the role of the teacher is not always to decide everything […] but to give students responsibility for the choices they make and to assume them afterwards."

- The identification of design projects by students:

Johann: "on average 120 references per year […] very contemporary".

- The identification of creative incentive by partners:

Yoann, Amèle and Renaud all speak of "carte blanche".

Human-based network renewal at different rates

Teachers renew their network at different rates, and sometimes progressively:

- Short-term renewal

For example, sponsors are usually invited only once for a specific order.

- Some partners return year after year as confidence develops:

Aymeric explains that the collaborations are set up gradually: "It starts with workshops at first" and then if necessary "later on as a temporary studio teacher".

- Long-term networks are also convened:

Anne mentions a speaker with whom she had "done a workshop" in a previous position and whom she "invited again".

As for Johann, she regularly invites five designers back to follow up on their diplomas. For example, she has worked with a designer since her previous position in another design school.

This has an impact on the teachers' environmental scanning and induces different rhythms of network identification for design teachers.

Conclusion and perspective

In this paper, we have presented the results of our research based on fourteen semi-structured interviews regarding the importance of the human-based network for design teachers. We stated that the human network is an important source of resource renewal and updating for design teachers. The importance of human sources and the human network for design educators is partly related to the discipline and the collaborative creative processes of design. Contact with users, other designers, and professionals from different fields excludes design practice without these interactions. We showed that design teachers have strategies to access professionals who master professional knowledge, to identify future societal issues and design opportunities within the environment and to acculturate students to a community of practice composed of the professional sphere.

Using our analytical framework, we presented different segmentations of the environment as well as the structuring of the human network, the fields of the people of the network and the type of resources to which it gives access.

Regarding segmentation and structuration, we differentiated the internal and external human-based networks involving different kinds of person and role: the internal network – which includes colleagues, students and inspectors – and the external network, which includes external actors, interacting with teachers during their private time, such as sponsors addressing orders, and partners, interacting with students during workshops or design projects.

Then, we showed that the networks, both internal and external, enable teachers to reach complementary counterpoints, professional skills and grey and fresh resources.

We also pinpointed that teachers outsource their monitoring to the network, for example when students select working partners for workshops, or when they monitor design projects that benefit the teachers. Partners also have "carte blanche" and design the workshops from start to finish. In this case, the teachers entrust them with the choice of creative incentives and emergences.

Finally, we showed that teachers renew their human networks at different rates. Sponsors are usually invited only once, while some designers return periodically to the training courses. Moreover, alumni are human sources used by the teachers who can lead to long-term partnerships. All these strategies help design teachers to stay up to date throughout their careers.

We recommend, based on our research results, that given the importance of the human network, a more structured organization of design teaching teams and a more systematized identification of human networks likely to be involved should be organized. This better organization could be used for planning through the students' training and result in better coverage of the different fields addressed with the students as well as greater mastery for each individual student.

From a broader perspective, human networks convened in other disciplines using project courses could be studied to identify their use of human-based networks. This work would have to be articulated to other environmental scanning sources that participate in global resource ecology.

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Gender and intercultural identity in ASD (Autism Spectrum Disorder) textbooks and educational media. Are we reproducing attitudes from the past?

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ABSTRACT

This work looks at the publisher GEU that publishes educational materials for special needs and inclusive students which caters towards individualized learning. They are currently considering re-printing and adapting some of their traditional textbooks to include updated content about gender and intercultural identity. Our purpose is to offer the publisher an investigative report focused on these concepts to give them advice on improving their future materials before printing them.

The main question addressed in the research is whether the publishers are still reproducing the same stereotyped models as decades ago. The methodology used in the investigation was qualitative, in line with authors such as Giroux (1996) from the critical pedagogy, for that reason, we have created our own file to identify gender and intercultural identity representation based on preceding works by pedagogists such as Martínez Bonafé (1995) and Parcerisa (1996).

The file was used to review the book entitled: Enjoying English with pictograms 1,2 activity books, belonging to a new collection of materials especially recommended for English language students with ASD printed in 2018. The results of the study did indeed demonstrate that they are still reproducing sexist models in their content, without inclusion of all sexual affective options, that racial differences are sometimes represented by stereotypes with the represented family models consisting of single-parent families and lacking in representation of interracial or mixed marriages, and finally a gay family appeared in only one of the pictures.

Months after our investigation, the publisher GEU released a pack on the market called *"Mi estuche de pictos": Todo son familias* (my pack of pictograms: They are all families) where allow teachers and students to use pictograms of different family models depending on their requirements and include models such as families with two fathers or two mothers, single-parent families, alongside a traditional one. A challenge that has no yet been addressed by them is the introduction of racial differences into these family models. Therefore, it is our role as researchers analysing the text to study their use in the classrooms to determine

their impact on the educational market as well as advise the publishers on how they can improve Textbooks and Educational Media by including multiple perspectives.

Keywords

Introduction

The background of this study is directly related to the research line of the author and her PhD in Pedagogy[31] on material assessment and design it is a topic that is very close to her current job as an English teacher in a Primary Education school with a high number of special needs students. Because of this, when a colleague showed her these two activity books entitled: *Enjoying English with pictograms 1, 2 activity books*, from a new collection of 5 English learning books especially recommended for ASD students printed in 2018 by the publisher GEU, it became her new challenge to analyse them.

GEU was established in 1996 as an educational publisher providing special needs and inclusive material which focuses on individualized learning, it is a market leader in subjects related to diversity. After publishing the books in 2018, the publisher committed to correct and update publications that include sexist or stereotyped content in favour of coeducation, as shown in their post on their website (2018, noviembre 6. Editorial GEU retira temporalmente Mis lecturas favoritas 2.2), to align with the values of modern society. After reading the post, we wrote a constructive critique about the activity books and shared it with the author to offer suggestions on how to update the content prior to printing the rest of the activity books of that series.

Theoretical framework

The present study falls within the Spanish legal framework related to coeducation and diversity in education, which is why it is important to mention the Organic Law 3/2007 of 22nd March, with regards to the effective equality of men and women, which states: the responsibility of "the Educational Administrations, within the scope of their respective competences" to carry out actions for Equality, "with special consideration to it in textbooks and educational media". And the Decree 104/2018, of July 27 of the *Consell*, which elaborates on the principles of equity and inclusion within the Valencian Education System.

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[31] Esplugues, Marta. (2015): *El currículum de la educación para el desarrollo en los materiales editados por las ONGDs*. Tesis doctoral. Defendida en la Universidad de Valencia. Directores: Jaume Martínez Bonafé y Paula Jardón Giner.

Our purpose is to advise publishers on how they can improve textbooks and educational media to adapt them to the current legislation. For that reason, we have created our screen tool which identifies gender and intercultural identities and to identify books that include sexist or stereotyped content, the tool is based on preceding works by Martínez Bonafé (1995), who created an identification sheet for curricular materials that we used as a basis for our tool and from Parcerisa (1996) from whom we adopted the concept of analysing the curriculum topics or transversal axes, to identify gender and intercultural identities.

The emptying file that we designed consists of different blocks: the first one is an introductory section with information about the activity book such as the title of the material, the printed year, the target public / students and some information about the publisher...followed by a more specific section where we identified the categories of gender and intercultural identity.

In the first category, we incorporated ideas from Espín López (2003) that we divided into the five subcategories. Starting with power and gender, we looked at gendered activities and roles commonly attributed to males or females and introduced concepts such as the glass ceiling and the sticky floor. On the theme of empowerment we analysed the representation of female figures partaking in activities more commonly attributed to the male gender, we also looked at coeducation and gender equity through the representation of plurality in gender identity, sexual identity and sexual affective options to counter common stereotypes, prejudices and discrimination.

Finally, we paid special attention to Gimeno Sacristán (1991) and his work on the hidden curriculum which addresses implicit values, prejudices, cultural stereotypes, and valuation of social differences (culture, gender, religion etc), aspects that we will further develop in the category of intercultural identity which is divided into a further three subcategories: the first looks at multiple and changing identities and diversity and intercultural representation; the second one looks into social cohesion, where we pay attention to communication, intercultural coexistence and inclusion; and the third one, addresses stereotypes, prejudices and discriminatory attitudes where the most key aspect is to identify attitudes to prevent racism.

For each of the categories, the structure of the file will be the following: the different columns collect the literal extracts of text and images for content analysis, while the lower rows are used for some annotations

or key ideas that will serve to dictate the discourse analysis when writing the reports on each activity book.

Methodology

Before creating the design of this study, we focused on the research question: are these activity books still reproducing the same stereotyped models as decades ago? Are they reproducing attitudes from the past? To solve that hypothesis we followed the study design in figure 1 to explain the methodology used. First of all, we have to highlight that the *methodology* used was a qualitative research (Taylor and Bogdan 1994) because it is an inductive type of analysis which allows us to establish similar characteristics that are present or absent in the texts and subsequently draw our own conclusions from repetitions found in the various books.

Secondly, we launched a critical-political study following in the footsteps of authors such as Giroux (1996, 2001) or Freire (2005, 2006), among others, as their works provided a reference when implementing the socio-critical perspective and cultural aspect in our research.

Regarding the research techniques, our intention was to analyse the content with special attention to the illustrations found within the materials, since books aimed at Primary Education often have scant language descriptions. With that information, discourse analysis was prepared to present the results of the investigation.

The objectives were focused on the curricular perspectives: gender and intercultural identity in the two activity books.

Figure 1: Research Design
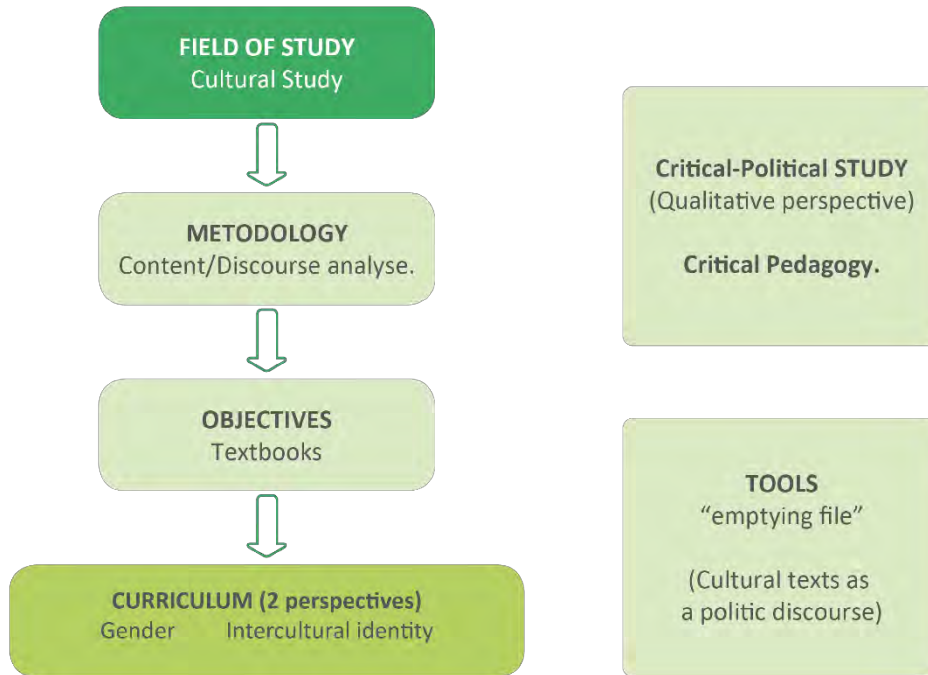
Source: Developed by the author.

Results and discussion of data

The following epigraph points out the result of the two categories analysed relating to gender and intercultural identity and also the discontinuation of the use of pictograms. Starting with the gender category, the activity books show women that are still represented in jobs more traditionally related to the female role such as a baker or a cashier (Activity book 2, p.13), without providing models of empowering women with professions such as doctors or architects that may serve as inspiration to our students.

However, it is also true that the material introduces two illustrations where the male figure is represented in roles more commonly carried out by the female gender, one of which is an elder man taking care of his grandchildren, and the other one, a middle-aged man doing the shopping (Activity book 2, p.13).

We can also highlight some questions about gender roles in TOPIC 4: What do you want for Christmas? There is an activity where students have to copy two sentences: *I want a soft doll and I want a teddy* (Activity book 2, p.51). The study shows that while girls readily identified with the "soft doll" with long hair and dressed in pink, a typical Caucasian white model, boys and girls also identified with dolls of different ethnicities such as African or Asian. This indicates that the publisher is reproducing stereotypes of

females being the being weaker and more gentle sex in the representation of a feminine doll, though the "teddy" is perhaps a more neutral toy that could also be associated with the male gender and does not possess the same qualifying adjectives.

To conclude the gender category, we added a small suggestion to one of the proposals: in the activity book, where the students are asked to stick the parts of the face onto an image (Activity book 2, p.27) it coincidentally appears to represent a short-haired boy, that it would be as simple as erasing the hair from the picture and allowing students to draw it themselves. In this way, we would give them the freedom to represent themselves in the way they identify with. This simple modification accommodates the different sexual affective options, reflecting ones that exist in our modern society.

In the intercultural category, the results highlight that racial monotony is a reality. It can be seen in the images used to identify different feelings (Activity book 2, p.17). We propose to include both male and female examples with the representation of heterogeneous ethnic groups. The same solution could be used in the pictures that represent the family model (Activity book 2, p.6, 15) which currently only depicts Caucasian and white families.

The researchers affirm that is not difficult to show our students different pictures with family models that reflect reality it only requires a couple of minutes to dive in your internet search engine, pixabay[32] or other similar websites to obtain free images. Our advice to the publishers is to try to avoid stereotypes and use real images more frequently because nowadays there are so many different skin colours.
Something similar happens when the company depicts the plurality of cultures that coexist in our classroom today the images used are stereotyped (Activity book 1, p.5). Perhaps here photographs could be a good resource. They have changed the skin colour of only the central character of the illustration, while the facial features do not differ from the other two Caucasian characters, a pattern that is repeated on other pages.

Racial diversity is evident in the material (Activity book 1, p.37) when representing second generations of immigrants born in our country, such as the blond boy with blue eyes that could be an Eastern European child, the African boy or the Asian girl. But after analysis of the rest of images, the study points out that the issue of intercultural identity should also be addressed in another way, because the use of a

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[32] Https://pixabay.com

traditional holiday such as Christmas (Activity book 2, p.29), only represents one form of religious belief whilst excluding representation of other religions and cultures such as Muslim, Buddhist, Jewish, all of which are equally important and relevant. Here, however, our criticism is not directed at the publisher, but at the curriculum, because "Christmas" appears to be associated with the high frequency "festivities" lexicon aimed at first-year Primary Education, within the content and assessment criteria of English as a foreign language.

It is time to delve into the issue of heteropatriarchy, because in TOPIC 3: My family (Activity book 2, p.5) there are contradictory models. On the one hand, the poster that introduces the unit depicts mono-parental and homosexual families, but, later on, the family that appears in the different activities is a traditional white nuclear family: a mother, a father, grandparents, children and a baby, lacking in representation of mixed or inter-racial unions.

In the final activity (Activity book 2, p.10) where students should copy the model, we would propose that together with the help of the teacher or another classmate, ADS students could represent their own family model by choosing stickers of different family and racial models. Following a methodology that integrates the Socio-critical Perspective, whose teaching/learning model is aimed at creating understanding, it enables students to learn from each other. This allows the students to go beyond the technical resolution of the proposed academic tasks, adapting to possibilities, needs and interests of the students, something that we believe the material is currently lacking. However, we recognise that the tasks are very well defined and structured for ASD students in spite of this.

Before the conclusion, we only have to address one question about the pictograms used, the iconic images used in the activity books aimed at helping ASD students with their communication. In the design of a pictogram, all superfluous details should be deleted (but that does not mean that gender and intercultural identity traits should be avoided). The pictograms are understood as a clear and schematic sign that synthesizes a message and although each organization creates its own designs or typographies, it is worth mentioning that the ARASAAC (Aragonese Portal of Augmentative and Alternative Communication) does present several family models such as adoptive, single-parent or homosexual families (although only homosexual) alongside traditional ones. In contrast, other entities such as PICTOTRADUCTOR or the publisher GEU represent only the traditional family model and there is evidence of racial monotony in their materials that do not accurately represent the diversity of the students.

Conclusion

In light of the file, we reviewed the book entitled: Enjoying English with pictograms 1, 2 activity books, which belongs to a new collection of materials printed in 2018 for English students highly recommended for Autism Spectrum Disorder students. The analysis reveals that GEU is a progressive publisher that advocates for equality yet continues to use pictograms and images that do not represent all identities, reproduces sexist models, does not reflect all sexual affective options and also uses stereotypes when depicting racial differences: the publisher does not depict non-interracial family models or mixed marriages. However, a single-parent family and a homosexual family do appear in the material. We continue with our research concerning inappropriate representation in the above areas.

We are proud of the reaction of the publisher as months after this study was released, GEU began to market a pack called *"Mi estuche de pictos: Todo son familias "*(My pack of pictograms: They are all families) where they give teachers and students the opportunity of use pictograms of different family models depending on their requirements, such as families with two fathers or two mothers, single-parent families, alongside traditional ones. The challenge that they have not yet achieved is to introduce racial differences into these family models. Therefore, we should continue our work as researchers to further analyse the texts, studying their use in the classrooms to determine their impact on the educational market and advising publishers on how they can improve Textbooks and Educational Media by portraying multiple inclusive perspectives.

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Links to educational material

http://www.arasaac.org

https://www.editorialgeu.com/es/

https://blogeditorialgeu.com

https://www.pictotraductor.com

Meanings of contextualization in Physics' textbook from The National Program of Textbook

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Abstract

Created by the federal government in 1985, the National Textbook Program (PNLD) regulates the production, evaluation, selection and distribution of textbooks for Brazilian public schools. In the late 1990s, the federal government published the National Curriculum Parameters to guide the organization of public education. The need to contextualize teaching contents regarding social, historical, cultural, and economic aspects has gradually become central to the methodological discussion in these documents, as well as to the definition of criteria for the evaluation of textbooks within the PNLD. This is the theme of the research whose partial results are presented in this text. The main objective is to analyze the contents of the Physics textbooks approved by PNLD to identify meanings that the concept of contextualization assumes in the propositions made by the authors, discussing them based on theoretical references and national curricular documents. This is a documentary research in which the contents of selected textbooks are analyzed. Two main indicators were taken into account: the use of Philosophy and History of Science and the relationship between scientific and everyday knowledge. Findings suggested that different contextualization resources are presented in the textbooks and that contextualization is still seen as a didactic resource rather than a constitutive element of scientific epistemology. Implications of teaching are outlined at the end of the paper.

Introduction

The idea that content should be contextualized is not new. In different ways and in different periods, educators and other specialists in the educational field have emphasized the importance of seeking to establish relationships between school knowledge and life, i.e. the North-American John Dewey (1938) at the beginning of the 20th century; the local culture of students, i.e. the Brazilian Paulo Freire (1970) in the middle of the 20th century or the Spanish Ángel Pérez Gómez (1998) at the end of the same century;

and the social experience of working in the global society, i.e. the North American Robert Berns and Patrícia Erickson (2001), from the perspective of the Contextual Teaching and Learning (CTL) under development over the past few decades.

In the Brazilian case, there are some specificities in the use of this concept in academic debates and in the appropriation by the national educational legislation that are still little studied. This was the motivation for the development of this exploratory research, which focuses particularly on Physics as a school subject in the high school curriculum.

Thus, this paper presents a research which aims to analyze the contextualization of Physics textbooks approved in the scope of the National Textbook Program (PNLD) of the Federal Government in Brazil. Created by the federal government in 1985, the PNLD regulates the production, evaluation, selection and distribution of books for public school students. The choice of textbooks by schools and teachers occurs in three-year cycles for each school grade and the chosen material is reused in the school during that period.

Since the creation of the PNLD, there has been a growing concern regarding the quality of textbooks. As a part of a deep educational reform in the late 1990s the federal government elaborated the National Curriculum Parameters (PCNs) to guide the organization of the public education system supported on the principles of the Social Democratic Party, the PSDB. A new general law (Lei 9394/1996) has changed the school structure and the PCNs proposed a new curricular conception in a neoliberal perspective, introducing concepts such as transversality and interdisciplinarity. Based on these documents, new criteria were formulated for the textbook evaluation process, guiding the publishers to make changes in the books.

Contextualization is an element that has gradually become central to the methodological discussions in these documents, as well as the definition of criteria for the evaluation of textbooks within the PNLD. This is the theme of the research under development at the Research Center in Didactic Publications of the Federal University of Paraná (Lous & Garcia, 2019), whose partial results are presented in this text.

Context and Research Problem

In general, Brazilian Physics courses are seen as disconnected from students' reality. Situations and phenomena presented in the classes are not close to the students and most of them say that "Physics is very complicated" (Angotti & Delizoicov, 1991). Academically speaking, there are consistent and numerous researches discussing this matter. Based on the results, some methodologies and strategies have seemed to face difficulties.

In order to solve the problem of the distance between the Physics knowledge and the students' cultural and social reality, debates in the field of Physics didactics point to the necessity of teaching it in a contextualized way. This suggestion was incorporated into the Brazilian curricular guidelines in the last decades. Taking in account these specificities, we have chosen Physics Textbooks as our research object. According to national curriculum documents, there are differences between Physics as a science and school Physics, although both are closely related. The scientific knowledge undergoes transformations and reductions until it reaches programs and textbooks, a conception which is based on the concept of didactic transposition (Chevallard, 1991). In this process, the school knowledge is decontextualized in relation to the problems that are in its origin, in its production in the scope of science; the decontextualization is one of the factors that make the processes of teaching and learning more difficult. Therefore, contextualization is pointed out as a necessity and it is also a way to re-approximate the scientific knowledge to reality, reversing the processes of decontextualization generated by didactic transposition and improving the conditions to teach such knowledge. Establishing the relationship between knowledge and the natural phenomenon to which it refers is another way of addressing the problems that come from decontextualization.

On the other hand, curricular documents and specialized literature indicate that the teaching program and its development in the classroom must be related to national, regional and local contents (Delizoicov & Angotti 1990), suggesting attention on the called "spontaneous concepts" brought by students, which produce effects on both the teaching and learning processes. Concepts built in the everyday life could be included in the teaching process as a way of stimulating students' interest and motivation; this also allows knowledge and real life, the students' experience, to be related. In this perspective, the meaning of contextualization is related to daily life and it is the strongest conception frequently found in specific literature. Other meanings were also found and will be discussed in the results.

The suggestion to contextualize the contents was incorporated into the Brazilian curricular guidelines and also into textbook evaluation criteria in the last decades. It has appeared in several items of the assessment sheet used by specialists who analyze, approve or reprove the collections to be made available for teacher selection. As referred, the evaluation of textbooks is sustained by a public policy called the National Textbook Program (PNLD), which distributes high school Physics textbooks, purchased with public funds, since 2009.

In the last Physics textbook evaluation (2018 PNLD), among the established criteria in official documents was the necessity of the textbook to present the contents of Physics taking into consideration its contextualization regarding social, historical, cultural, economic and daily life aspects. In this context, the main objective of the research is to analyze the contents of the Physics textbooks approved by the

PNLD in order to understand meanings that the concept of contextualization assumes in the propositions made by the authors of these books, discussing them based on theoretical references and national curricular documents, since this is a subject little addressed in academic works.

Methodology

Considering the lack of discussion of this matter in the literature, the necessity of an exploratory study was defined. The general objective of the research is to analyze the types of contextualization present in the Physics textbooks approved by the PNLD. The specific objectives are: a) identify contextualization concepts present in the educational documents; b) identify and select textbooks approved by the PNLD; c) analyze the contextualization concept present in the selected textbook collections.

Methodologically, this is a documentary research in which the contents of selected documents and textbooks are analyzed. Thus, the empiric work was divided into stages, with the following procedures:

a) **Official documents analysis**: National Curricular Orientation to High School-Physics (Orientações Curriculares Nacionais, 2006) and PNLD Guide (Guia, 2018)

b) **Textbook selection:** Two collections approved by the 2018 PNLD and one collection approved by the 2015 PNLD were selected, using different criteria and constituting a choice driven by the research objectives (sample of convenience). The first one was chosen for its high acceptance among public school teachers. The second one was chosen because it was approved in a previous selection and was not included in the following call for proposals and it was recognized as a good textbook. The third collection was chosen because it was highlighted in Souza's research (2019) for stimulating the work of students and for seeking to overcome a traditional teaching view.

c) **Textbooks previous analysis:** Selection of themes and volumes that could offer a higher potential for contextualization.

d) **Identification of contextualization resources**: Following previous reading, a search was conducted in each textbook **to locate contextualization resources** available using procedures suggested by Martínez-Valcárcel (2018). We searched for the following predefined elements: Historical texts, daily life texts, interdisciplinary texts, experience texts, historical images, daily life images, experience images, graphs and equations.

e) **Textbooks analysis** according to the predefined elements, using two categories: The use of Philosophy and History of Science; The relationship between scientific and everyday knowledge.

Some Results: meanings of the contextualization

The results of the analysis are organized in two sections. The first one presents the main ideas of contextualization suggested by the curricular documents; the second section presents ways of contextualization used by the textbooks, related with the official documents previously analyzed.

Curricular documents and meanings of contextualization

The first federal curricular publication that emphasized the need for contextualization were the National Curriculum Parameters (Parâmetros Curriculares Nacionais, 2000), followed by the National Curriculum Guidelines for Secondary Education (Orientações Curriculares Nacionais, 2006) that indicated that one of the components of curriculum organization for this level of education should be the "integration and articulation of knowledge in a permanent process of interdisciplinarity and contextualization". (Orientações, 2006, p.7)

In the second volume of the National Guidelines, specific to Natural Sciences (Orientações, 2006, p. 49), attention is called to the fact that textbooks present the contents with simplifications and that these mask the difficulties in the process of scientific production of that knowledge, inducing the student to only memorize equations and main concepts, without the need to seek answers to real problems. The document suggests that contextualization and interdisciplinarity contribute to develop the investigative skills necessary to learn Physics in the assumed conception. In the same document, it is stated that: "An appropriate didactic treatment is the use of History and Philosophy Science *to contextualize the problem*, its origin and the attempts to solve it that led to the proposition of theoretical models, so that the student is aware that there was a path taken to reach this knowledge (Orientações, 2006, p. 50. Our emphasis).

Still in volume 2, the use of History of Science is justified to enrich the teaching of Physics and make the learning process more interesting: "(...) approaching the scientific aspects of historical events enables the vision of Science as a human construction". The document highlights the following approach: "it is aligned with the development of the general competence of sociocultural contextualization, because it allows, for example, to understand the construction of Physics knowledge as a historical process, in close relationship with the social, political and economic conditions of a given time" (Orientações, 2006, p.64).

In addition to this relationship between contextualization and the History of Science, the document emphasizes what it calls the "other dimension" of contextualization that "relates scientific knowledge to everyday life. However, the document mentions a misconception: "Many times, contextualization is mistaken for daily life, but this relationship is not so simple" (Orientações, 2006, p.50). The document states that it is not about "starting from what the student already knows and reaching the scientific

knowledge, but from critical thinking to common sense and providing alternatives so that the student feels the need to seek and understand this new knowledge. (Orientações, 2006, p. 51)

It is evident that the discussion on the subject is complex and that, therefore, the contextualization becomes a challenge for teachers in their high school classes, in the structural and conjunctural conditions of Brazilian public schools today. The documents themselves, supported by the concept of competence - from their relations with professionalization and work - make it difficult to effectively understand the concept of contextualization. Sometimes it is presented as a "didactic resource", which is used to problematize the reality experienced by the student, extract it from its context and draw it for analysis (p. 51); sometimes it is presented as an element to maintain the student's interest in learning and with a motivational effect (p. 64); also, to bring questions, challenging the students (p. 49). It should be noted that the document points out that the first step of "contextualized learning" can come "from the choice of phenomena, objects and things from the experiential universe. "Real-world problems tend to often provide more creative solutions and are presumably more significant and motivating than artificial problems". (Orientações, 2006, pp. 60-61).

Based on the analysis of these documents, it was noted that there are two main forms of contextualization suggested. The first is the contextualization related to everyday life, in which it seeks to approach objects and phenomena of the student's daily life to, based on them and the concepts already constructed, lead the student to appropriate the systematic Physics knowledge that maintains relationship with those phenomena or objects. And the second form stems from the relationship with the History of Science, proposing that students approach the issues that originally challenged the work of scientists in search for solutions or explanations, without excluding the difficulties and problems that have shaped this process. In both forms, the relationship with the need to problematize the themes to be addressed is explicit.

Textbook Analysis

Based on a choice driven by the research objectives (sample of convenience), three textbooks were selected to be analyzed -Textbook A, B and C.

The main elements of the formal structure of the textbooks – text and image – were analyzed. Based on a page-by-page analysis, we searched for signs of contextualization in the different directions found in the official documents previously analyzed. A quantitative survey of the following categories of resources was then carried out: historical text, daily text, interdisciplinary text, experience text, historical image, daily image, experience image, graphs and equations.

The quantitative analysis showed that all textbooks have very similar aspects in every category; and different contextualization resources are present, as follows:

Graph 1. Elements in the Textbook A
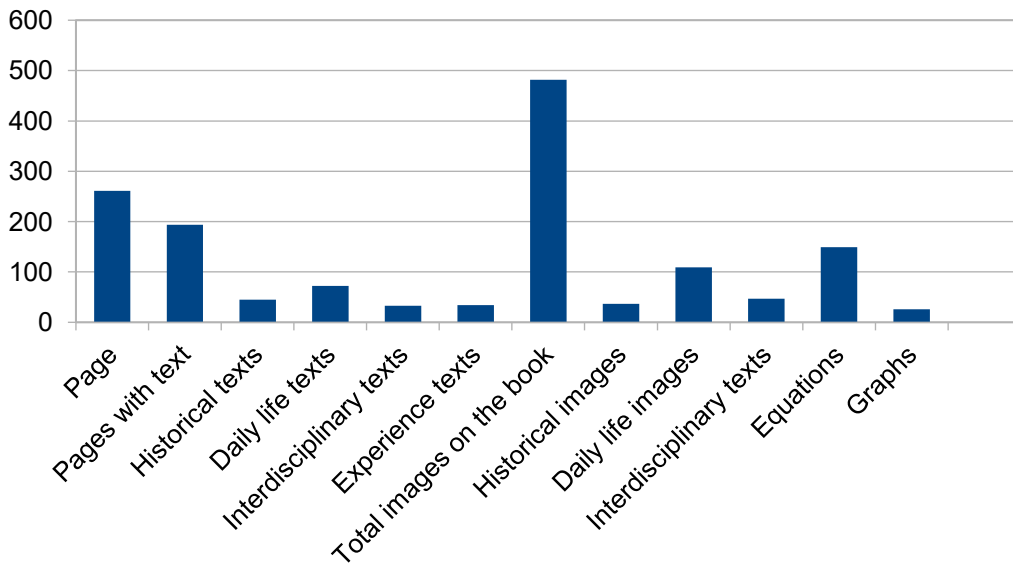
Graph 2. Elements in the Textbook B
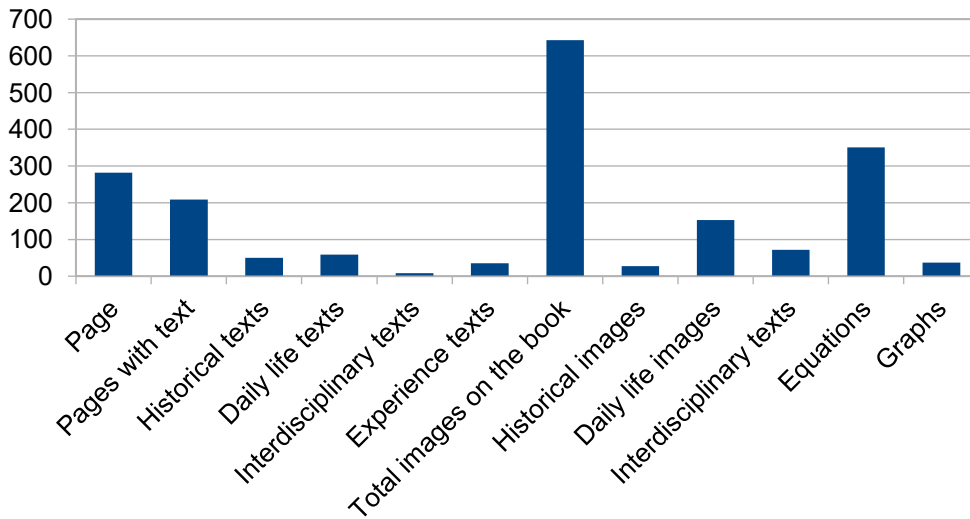
Graph 3. Elements in the Textbook C
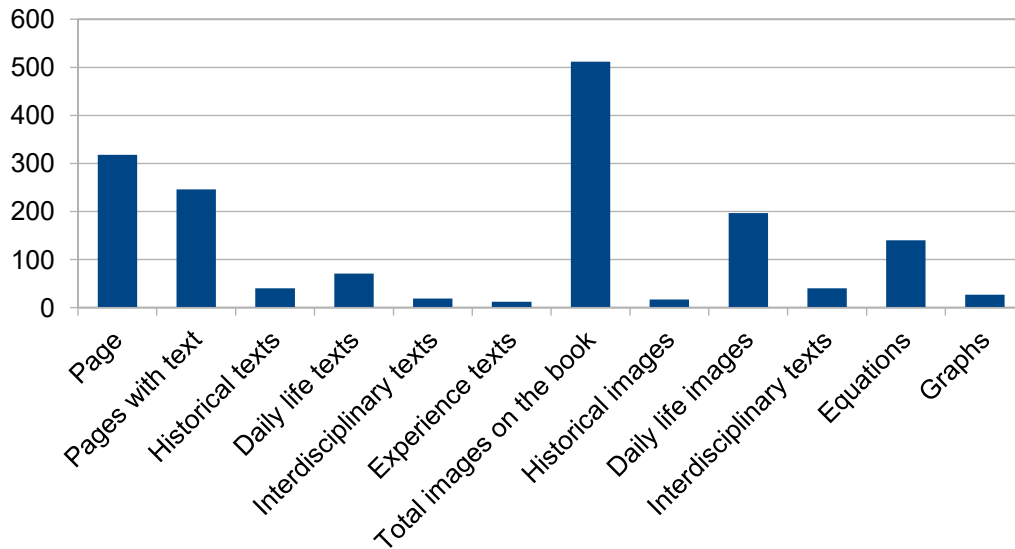
Source: Lous (2019).

The graphs show the total number of pages, texts and images (columns 1, 2 and 7) in each textbook. The other columns (3, 4, 5, 6, 8, 9, 10, 11 and 12) show the elements that were considered as resources that enable some type of contextualization, according to the parameters presented in official documents. Based on the data collected, there are common features among the textbooks.

a) Regarding the texts: Textbooks A, B and C have virtually the same number of non-text pages in relation to the total number of pages. In regard to the total number of texts in each volume, textbooks A and B are similar in the number of historically contextualized texts, presenting a small difference in relation to textbook C, which has a slightly smaller number of texts of this sort. In relation to the quantity of texts related to daily contextualization and experiences, the textbooks analyzed maintain strong similarity. The main difference among them refers to the amount of texts.

b) Regarding the images: Image data is also very similar. In all cases there are more images than pages: in textbook A, the ratio is 1.84 images per page; in textbook B the ratio is 2.28 images per page; and finally, the last textbook has a ratio of 1.61 images per page. The total number of images with historical contextualization among the textbooks is very similar, especially in books A and B. Textbook C presented a smaller number of contextualized images, in every type (historical, daily and experience contextualization).

c) Regarding the equations that use graphs to expand the possibilities of reading and understanding the concepts, the relations were also similar, with great similarity regarding the quantity in textbooks A and B and a smaller quantity in textbook C.

Thus, the quantitative analysis showed that, in general, and despite small differences, the textbooks have similar characteristics in relation to the forms of contextualization, both from textual and visual points of view. Among the results of the qualitative analysis, we highlight the following points with examples:

a) Most contextualized texts are presented out of the main text; in other words, the authors feel the necessity to open a "dialog box" or new topics to discuss the matter in a contextualized way.

A vantagem dessa grandeza é que ela expressa a energia potencial que uma carga unitária recebe na posição P de um campo criado pela carga Q.

A unidade utilizada para medir o potencial elétrico no Sistema Internacional é o **volt** (V). Então, um potencial de 1 volt é igual a 1 joule (J) de energia por 1 coulomb (C) de carga. Assim:

$$1\,\frac{J}{C} = 1\,V$$

A FÍSICA no cotidiano

A pilha elétrica

Os dispositivos eletrônicos e seus periféricos trouxeram mobilidade e praticidade à nossa vida. Mobilidade é a qualidade que dispositivos ou processos geram ao serem usados em contextos mais amplos que aqueles para os quais foram projetados. Celulares, *notebooks*, controles de televisão, *mouses*, marca-passos, todos esses aparelhos funcionam à base de eletricidade, sem estar ligados à rede elétrica, e isso só foi possível com a criação de pilhas e baterias portáteis.

Independentemente dos aparelhos a que se destinam, pilhas e baterias são indispensáveis para o modo de vida a que nos habituamos, e é muito difícil visualizar a sociedade como a conhecemos sem esses dispositivos. Por exemplo, antigamente, para ouvir música ou usar um telefone, as pessoas deviam se dirigir a algum lugar onde um aparelho compatível com uma dessas funções estivesse disponível. Os computadores existiam em pequeno número e, inicialmente, ocupavam grande espaço de

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In this example, the main text is about electrodynamics and it says "*the advantage of this physical quantity is that it express the potential energy [...]*". After to present the concepts and the equation, the author opens a dialog box called "*the daily physics*" which talks about electrodynamics in a contextualized way using battery as examples (Textbook B, p. 54)

b) All of the textbooks have plenty of images but very few of them are contextualized. Most of the images are not intrinsically connected with the main text. They work as an illustration rather than an essential element for the comprehension of concepts.

Cada uma das teclas do teclado é parte de um capacitor.
Ao serem pressionadas, as placas do capacitor se aproximam
e um sinal é enviado para o processador do computador.

As we see in the example (Textbook A, p. 57) the image is not clearly connected with the presented concepts: *"Each of the keyboard's key are a capacitor's part. When being pressed, the plates get closer and a signal is transmitted to the computer's processor".* The photo is an example of an image which works as an illustration rather than an element contributing for the comprehension of the concepts.

Final Considerations

Considering all textbooks analyzed we conclude that, in this scenario, contextualization is still seen as a didactic resource rather than a constitutive element of scientific epistemology. The documentary analysis shows the lack of integration between scientific and didactic texts in the textbooks.

The analysis identified difficulties in transforming the orientations of the official documents into proposals to present scientific knowledge in a contextualized way. It was also possible to identify the difficulty of the authors to elaborate proposals that relate the Physics knowledge to the History of Science, bringing young students closer to the questions that generated that knowledge without eliminating the difficulties and problems that marked the scientists' elaboration process.

A third point to be highlighted is that the analyses carried out so far show that the elaboration of criteria by the edicts of the National Textbook Program (PNLD), in the case of Physics, may be producing an accentuated effect of standardization in the structure of textbooks. The control over content, such as the need to contextualize the concepts and processes - the focus of this research project - and also the control over the form (total number of pages, valuation of images, graphs and tables, colors, among others) have produced positive results regarding the presence of errors, stereotypes and methodological inconsistencies, but also an effect of homogenization, reducing the space and the interest for the proposition of differentiated textbooks. The research will continue looking into other collections.

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Indigenous history and culture in Brazilian history textbooks: rules and practices

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Abstract

The research theme is the use of History textbooks, in a particular situation of school experience: the indigenous villages of Santarém, State of Pará, in the Brazilian Amazon. The use of ethnography was defined as the methodological approach, including different strategies such as participant observation, interviews, documentary analysis and others that may be structured during the fieldwork. The first stage, whose results will be presented, consisted in the identification and analysis of the History textbook that are used in the villages. The main objective was to analyze the content of the textbook regarding the elements on the history and culture of the indigenous peoples presented. The results of the analyzes show that although some gaps remained, indigenous populations gained greater visibility in the different periods of the Brazilian History; but although some prejudices have been eliminated, the indigenous representations still do not contemplate the cultural diversity of the Brazilian indigenous populations.

Introduction

Choppin (2000, p. 116) points out that "every manual is historically and geographically determined; it is the product of a social group and a specific time". Based on these concepts, the research discusses the production of History textbooks in Brazil, intended for public schools, specifically those that are used in indigenous schools, in the municipality of Santarém, State of Pará, Amazonia. The production, evaluation and circulation of Brazilian textbooks are monitored by the National Textbook Program (PNLD) and follow a set of rules stated in the educational legislation as well as the specific rules of the program.

The research problem is therefore related to the indigenous matter, which has received the attention of researchers from different fields, and is particularly relevant in the educational area. The theme has been relevant in the Brazilian educational legislation for the last two decades, aiming to ensure a differentiated

schooling system to indigenous communities and villages and to determine the inclusion of indigenous history and culture in nationally distributed textbooks.

This text presents the results of an exploratory study on the contents and images related to indigenous peoples conveyed by textbooks, since they also circulate in indigenous village schools. The objective at this stage of the research was to analyze the content of textbooks as well as the elements regarding the history and culture of indigenous peoples presented on the textbooks, comparing the elements presented in the textbooks with the PNLD evaluation criteria.

To show the results, the text initially presents the legal requirements on the inclusion of indigenous matters in textbooks, and then describes the procedures and results of documentary research conducted by analyzing the data obtained. At the end, considerations about the results are presented.

The educational legislation related to indigenous matters

According to Daniel Munduruku (2012), Brazilian indigenous citizen and researcher, since the late 1980s there have been substantial changes in the Indigenous Movement, resulting from recent awareness between the indigenous population and the national society. For this author, the approval of laws that understand the importance of indigenous societies in the national context and the need to recognize them is part of the achievements of the Indigenous Movement (2012, p. 224).

From the 1980s onwards, as part of the Brazilian Indigenous Movement itself, national laws have been passed to seek visibility to indigenous peoples in the history of Brazil. According to Grupioni (2001, p. 9), these legislations have been "recognizing that the aboriginals could use their mother tongues and their learning processes in school education, a possibility was created for the indigenous schools to contribute to the process of ethnic and cultural affirmation of these peoples". Therefore, the right of a school to be organized from the cultural aspects of each indigenous people, in its diversity, is affirmed.

Educational laws have come to recognize the right to a differentiated education, as established in the National Education Guidelines and Bases Act and the National Education Plan, among others. For Grupioni (2001, p. 9), these laws "have addressed the right of indigenous peoples to a differentiated education, based on the use of indigenous languages, the valorization of the millenary knowledge of these peoples and the formation of the aboriginals themselves to act as teachers in their communities".

The right to differentiated education became a legal obligation through Decree N. 6,861 / 2009, which provides for Indigenous School Education and defines its organization in ethno-educational territories. The Decree states that:

> Each ethno-educational territory will include, regardless of the political-administrative division of the country, indigenous lands, even if they are discontinuous, occupied by indigenous peoples

who maintain intersocietarian relations characterized by social and historical roots, political and economic relations, linguistic affiliations, shared cultural values and practices. (Decreto nº 6,861, de 27 de maio de 2009).

Article 3 of the Decree clarifies that "indigenous schools shall be recognized as *schools with their own norms and specific curricular guidelines*" and that schools shall focus on intercultural and bilingual or multilingual teaching. It also gives schools "special prerogatives to organize school activities, respecting the flow of economic, social, cultural and religious activities and the specificities of each community, regardless of the calendar year." (Decreto nº 6,861, de 27 de maio de 2009. Our emphasis).

According to the Law N. 14/99, which refers to the National Curriculum Guidelines of Indigenous School Education, in order to guarantee a differentiated education, it is necessary that it is built with the participation of the indigenous community. It also clarifies that it is not enough that the contents are taught through the use of the mother tongues: it is necessary to include curricular contents properly indigenous and to welcome proper ways of transmitting the indigenous knowledge. More than that, it is essential that the elaboration of curricula, understood as a process always under construction, is done in close harmony with the school and the indigenous community it serves, and under the guidance of the latter (Parecer CNE nº 14, 1999).

Ethnographic research carried out in indigenous schools has shown that in the process of building these schools the communities present specific demands, which do not necessarily correspond to what is provided for in legal texts. Research by Cohn (2016), for example, shows that the differentiated school education project is not always shared by the indigenous populations themselves, who often value the school in its traditional models. The author found that the *Xikrin* do not want school to learn their knowledge, their *kukradjà*, but to learn the knowledge of white people (Cohn, 2016, p. 324).

Faced with this complexity of contexts, in which each indigenous people present different views about the school and have different forms of appropriation of educational legislation, there are still many issues to be investigated. One of the questions refers to the need to analyze how legal regulations relate to the production of textbooks used in indigenous schools.

Indigenous school education and legislation related to textbooks

The acquisition of textbooks for public schools in Brazil, both indigenous and non-indigenous, is made by the Federal Government. It is carried out by the National Textbook Program (PNLD), coordinated by the Ministry of Education and the National Fund for Educational Development. The textbooks

submitted to the evaluation of the Program, and therefore approved, are acquired directly from commercial publishers.

The textbooks are sifted by specialists who prepare evaluation reports, in accordance with the criteria established in the public notices of the Federal Government. These public notices establish the criteria that will be used in the evaluations (technical and academic) and thus define whether or not the textbooks may be available for teachers' selection, and further purchase by the Federal Government (Oliveira, 2013, p. 360).

A specific law (Lei N. 11. 645/2008) established the mandatory nature of the study of Afro-Brazilian and Indigenous History and Culture in Brazilian schools. As a consequence, requirements were established for this theme in materials and textbooks, especially in History textbook. Thus, as of 2008, the PNLD edicts began to require the presence of the indigenous theme in textbooks as an approval criterion. In addition, there are criteria that evaluate the contribution of the textbook to the construction of citizenship, establishing that the presence of prejudices and stereotypes is a criterion of exclusion from the list offered to the choice of teachers.

On the indigenous matter, the PNLD requires compliance with law N. 11.645/2008, defining that there will be an approval if: "[the textbook] contributes to giving positive visibility to Afro-descendants, indigenous peoples and women, considering their participation in different jobs, professions and social, cultural and power spaces, *in different historical temporalities*". (Edital de convocação,2015, p. 135. Our emphasis).

Although the national legislation has taken action on editors and authors in order to meet demands regarding the inclusion of subjects and populations not previously included in school history, it is understood that these processes are complex and should be monitored by researchers. Gradually, some problems have been eliminated, but difficulties still remain (Garcia & Maciel, 2011). They need to be identified, and this is the objective of the research carried out.

Methodological procedures

The research analyzed representations of indigenous peoples present in textbooks approved by the 2017 PNLD and in use in public indigenous and non-indigenous elementary schools (6th to 9th grades). Considering the objectives, a documental research was conducted.

The selection of textbooks for analysis was made based on the spatial cutout: the indigenous schools in the municipality of Santarém-PA. This was followed by a survey of History textbooks acquired by the government for indigenous schools, particularly in the Tapajós/Arapiuns Educational Territory. The source was the reports of the National Fund for Education Development (FNDE), available in the

Educational Material System (SIMAD, 2017). The survey showed that the collection "History: Society and Citizenship", by Alfredo Boulos Jr, was one of the main collections chosen for use in the Tapajós/Arapiuns Ethnoeducational Territory. The collection is also widely accepted by teachers from non-indigenous schools.

The objective is to analyze the ways in which the indigenous theme has been handled in History textbooks and, thus, to understand if they open possibilities of articulation with the knowledge of the indigenous peoples who use them. The idea presented by Bittencourt (2013a, p. 73) is accepted as it points out that the ways teachers and students use the materials are varied and that they can transform them into efficient work tools and appropriate to the needs of an autonomous education.

The procedure used was the analysis of the content, using indicators extracted from the legal determinations for the production of materials for indigenous school education. Images and texts present in all volumes of the chosen collection were preliminarily examined. Finally, the analysis was focused on the volume intended for the 6th grade, in which the indigenous theme has a significant space and is on the front cover.

Source: Cover of volume 6 of the book under review (Boulos, 2015)

Representation of indigenous peoples in the textbook

The textbook analyzed is used in several schools of indigenous villages in the Ethnoeducational Territory of Tapajós/Arapiuns. Within the limits of this text, we chose to explore the representation of the indigenous people in two specific situations: children and housing. The indigenous children are represented in a work proposal regarding historical time, which is one of the curricular contents of the 6th grade, often discussed in association with the presentation of the historian's job, and the role of sources for the production of historical knowledge.

The author establishes this relationship using images of children - a couple of white children, a couple of black children and several indigenous children. While the white children have fun with video games, the black children play with Lego, and indigenous boys and girls have fun without any toys, improvising games. In the explanatory text, the author states that the images could be used as sources by a historian

who would like to know, in a hundred years' time, what are Brazilian children's favorite toys. This is the page mentioned:

Source 2: Facsimile page of the book under review (Boulos, 2015, p. 18)

Beyond the author's intentionality, present in the explanatory text regarding the historian's job, the images can construct mistaken ideas, among others, regarding the historicity of indigenous peoples. The use of technologies such as computers, cell phones and electronic toys is a reality in indigenous villages. The denial of indigenous peoples' contact with technologies has been a recurrence in media productions and reaches textbooks through images, as it can be seen.

In addition to being distanced from technological advances, the images of indigenous peoples in today's History textbooks have frequently resorted to the presentation of indigenous people with body paintings and straight hair, which contributes to the construction of stereotypes, extending this biotype to all Brazilian indigenous people. The analysis also applies to the following image:

Photo 03: Activity with image present in the textbook analyzed (Boulos, 2015, p. 106).

The activity presents two sources: the first, a photograph, with the caption stating "Children playing tug of war. São Paulo (SP). 2007". The caption on the second one states "Illustration of indigenous children playing tug of war". In addition to the difference in the presence or absence of clothes and body paintings, which reveal the stereotypes characteristic of media representations, the relationship with temporality and spatiality is also highlighted - the photograph is situated and dated, while there is a lack of information to help the reader situate where and when those indigenous children live.

What we often learn about aboriginals at school is basically associated with the images conveyed by the media: a generic aboriginal i.e., not linked to any indigenous people, or to any specific culture. The representation corresponds to a biotype of individuals living in the Amazon Region and the Xingu, with straight hair, many body paintings and feather ornaments, naked, forest dwellers, carriers of exotic cultures, among other characteristics (Silva, 2017, p. 76).

Despite the legislation and evaluation processes, such representation still persists today in the school universe, through History textbooks, constituting a kind of "canonical image" (Bittencourt, 2013b, p. 81). According to the author, the representation of indigenous populations has suffered significant variation

among History textbooks authors over time, registering changes and permanencies. Regarding the places of residence, it is common to present them only as villagers, as observed:

Photo 05: Photograph of indigenous villages on the textbook analyzed (Boulos, 2015, p. 101).

In the specific case of indigenous peoples' housing sites, despite changes in representation techniques - drawing (lithography) or aerial photographs - there is persistence in the construction of images, spreading the idea that all indigenous peoples live in villages and use the technique of building houses with straw and timber. The textbooks hardly present images of indigenous peoples living in masonry residences or in cities.

Therefore, it is understood that in addition to the analysis of the content of textbooks on indigenous matters, it is necessary to meet the cultural dynamics produced in the History classes of indigenous communities, to know some effects of the use of didactic works in this specific situation, as well as the relationships that teachers and students establish between the representations of textbooks and the culture of these peoples. As Bittencourt (2013b, p. 89) states, "textbooks can be transformed in the hands of teachers and undergo considerable changes".

Final Considerations

The exploratory study shows that, undeniably, there were changes in the Brazilian educational legislation that established guarantees to indigenous peoples, in particular the entitlement to a differentiated education and the construction of curricula and didactic materials that dialogue with their cultures,

languages and forms of knowledge. However, between the constitutional regulations and the practices, there is a space for reproduction and social production, which involves the interests, the relations of power and also the cultural ways of understanding and organizing the school practices of each indigenous people, of each village and community.

The construction of differentiated schools is not consensual for all indigenous groups. Similar discrepancy can be seen regarding school textbooks. For some indigenous groups it is important to have differentiated textbooks, while other peoples have chosen to participate in the PNLD and purchase the same textbooks that are used in non-indigenous schools. These books are produced in a regulated system, since there is a set of rules that define their production, evaluation and circulation.

From the point of view of indigenous themes, one can observe changes in the image representations and contents of textbooks in the last decade. In particular, it must be said that there is a reasonable consensus among researchers that some problems have been solved through these evaluation processes. One of the advances is the fact that the textbooks have given greater visibility to the indigenous peoples in the narratives they present regarding the History of Brazil, expanding the references to the presence of indigenous people in different historical periods, previously generally reduced to the context of the colonial period.

Despite this, traditional ways of representing these peoples in the teaching of History have not yet been overcome, as it was highlighted in the situations exemplified in this text. It is necessary that the textbooks address more intensely the cultural diversity of these peoples, their multiple histories, valuing their perspectives on the construction of the nation.

It is important to note that certain stereotypes were not eliminated with the PNLD evaluation process, composing a universe of canonical representations regarding the indigenous peoples, who have been historically crystallized in the Brazilian school culture. Such understanding is formed by the idea of a past time aboriginal, wearing few clothes and body paintings. Contemporary aboriginals, who live in the woods and also live in the cities, who study at universities, who use technology in their daily lives and work, are still little incorporated into History textbooks.

The analysis of these representations does not have the purpose of simply presenting problems in textbooks, surpassed by the set of existing researches that contribute to demonstrate advances that have occurred in recent decades. It is also not enough to point out tensions between the proposals of a differentiated education and the choice of textbooks that circulate in indigenous schools, since the limits of textbooks can be resolved by the efficient work of teachers and the school culture itself.

The observation of the changes and permanencies of indigenous representations in textbooks indicates the challenges for research on the use of these materials in schools in order to know the ways in which

teachers and students consume textbooks, the actions they can undertake in their daily school life and the effects of the circulation of these representations among the subjects of indigenous villages.

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Young students and the PNLD textbooks in a settlement school: specificities in the rural schools of Brazil

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Abstract

The central theme of the research is the relationship between the specificities of schools located in rural areas, the ways of being a young student in these localities and the textbooks produced and distributed by the federal government to Brazilian public schools. The research problem stems from discussions in the country regarding the need to produce specific textbooks for schools located in rural areas, different in both content and form from the textbooks produced for urban schools, and the controversies generated by this proposition. The context of the research lies in the experience of countryside schools located in settlements of the Agrarian Reform of the Movement of Landless Rural Workers (MST). The main objective was to analyze the presence of textbooks in school life, seeking evidence of the existence of school specificities that justify the need or not of textbooks especially produced for such students, who, in this particular condition, are Brazilian high school students living and studying in Agrarian Reform settlements. Methodologically, it is an ethnographic research that used participant observation, documentary analysis, interviews and other instruments of data production as empirical work procedures. The analyses pointed different uses of the textbook in the school, the meanings attributed to this resource by teachers and students and also evidenced the subjects' point of view on the problem of specific textbooks for students living in rural areas, supporting arguments contrary to this proposition.

Introduction

In Brazil, public schools receive free textbooks from the National Textbook Program (*PNLD*), which evaluates and purchases them according to the schools' choice. As of 2011, the program PNLD Countryside (*PNLD Campo*) was created. This program purchases textbooks specially made for rural schools in the initial grades of Elementary School. The PNLD Countryside has generated different

situations in the production, evaluation and choice of textbooks, which has produced discussion and debates and some researches have been developed to understand the effects of this program. Currently, the high school textbooks are still the same for schools in urban and rural areas

This problem is related to the Countryside School and Education, a name used to refer to education in rural areas since the 1990s in Brazil. This proposal originate from the social movements in the countryside, organized to defend public schools located in rural areas, with quality and structure based on significant knowledge, valuing peasant subjects, their history and their culture.

Among the discussions that were built over the last 30 years on this issue, it was defined by the use of the expression "Countryside Education" and no longer "Rural Education" as used in the Brazilian tradition. This option relates, on the one hand, to the defense that people are entitled to receive education *in the place where they live*, without having to leave rural areas to study. And, on the other hand, it means that these populations have the right to *an education that is carried out with their participation* that is linked to their culture and their human and social needs.

The discussions on Countryside Education were created with the main objective of "associating the struggles of different particular subjects with common social interests in the movement within the struggles for rights made directly by those who perceive themselves as excluded from them" (Caldart, 2015, p. 83). These discussions are related to agrarian reform struggles in Brazil, whose actions are carried out by social movements in the countryside, including the Movement of Landless Rural Workers - MST. The MST emerged in Brazil in the late 1970s and early 1980s, still during the military dictatorship (1964-1984). Its claims are the basic social rights to land, work, dignified life, food, gender equality, health and education. Abelardo Luz is a municipality in the south of the country, which concentrates the largest number of settlements in the Santa Catarina state: there are 1500 families in 22 settlements. One of the results of the achievement of the right to land in this location was the conquest of schools for children and young people: two elementary schools, a Federal Institute that offers technical high school classes and higher education, a special education school and two high schools. The research was developed in one of last mentioned, the Paulo Freire High School.

The research focused on the relationships between the specificities of schools in the countryside, the ways of being a young student in this location and the textbooks distributed by the federal government for Brazilian public schools. The research problem stems from discussions in the country about the need to produce specific textbooks for schools located in rural areas, different in content and form from the textbooks for urban schools, and the polemics generated by this proposition.

Conceptually, the starting point is the school as a social construction (Rockwell & Ezpeleta, 2007). This concept can contribute to explain elements present in the school experience originated from the struggles

of the social movement, which is opposed to reproducing the capitalist school model and proposes another conception of school and another form of organization, more appropriate to these populations. Despite the advances that can be pointed out in the movement's actions, this construction is marked by structural and conjunctural determinations that make it difficult to achieve the proposals and that create clashes and tensions (Vieira, 2018).

In one sense, the government's actions aimed at producing and distributing specific textbooks for these schools correspond to this demand of the social movements. On the other hand, the actions resulted in qualitative differences in textbooks, which were criticized by different groups, including teachers from these schools and researchers (Vieira 2013; Borowicc 2016). The textbooks were also the subject of debate by social movements.

Therefore, the research aimed to analyze the presence of textbooks in school life, seeking evidence of the existence of school specificities that justify the need - or not - of textbooks especially produced for such students, who are Brazilian high school students living and studying in Agrarian Reform settlements. Sociologically, the perspective was to focus on the subjects' point of view (Bourdieu, 2002), in this case the young students and the teachers who live, teach and learn in the locality.

Research context

The MST is a social movement that began in Brazil at the end of the 1970s, articulating the struggles for agrarian reform, including others of equal importance such as the models of agriculture and social organization in the countryside, the right to land, food, work, a dignified life, and the education of peasants and the working class.

The MST schools may exist in two situations: temporarily, in settlements, where the school exists in improvised spaces in the territory occupied by the movement, and may, if necessary, change place along with the families; or the definitive situation, in settlements, when the families are settled on the land, which occurs after the federal government has issued a document formalizing the concession of use for an indefinite period of time, and the land may be passed on from generation to generation.

The defense of a specificity for these schools is at the origin of the discussions about the settlement school and expresses the struggle of social movements for public policies. According Caldart (2017, March 26) "this specificity refers fundamentally to the processes of production and work in the rural areas, social struggles and the culture produced from these processes of reproduction of life, of struggle for life".

Originated in the demands of social movements, the concept of specificity is now also used in documents, legislation, policies and programs related to rural areas. Included in government agendas of different

political and ideological orientations, it has also started to raise questions. Currently, Countryside Education is an object of research in the academic environment, it is a teaching modality in the norms of the Ministry of Education (MEC), and it constitutes a concept, a category of analysis in the production of knowledge on the subject.

As the concept was consolidated, new demands for public policies for rural areas were made. Among the actions proposed by the federal government, the National Textbook Program - Countryside stands out. It evaluates, purchases and distributes specific textbooks for the initial grades of Elementary Education in countryside schools, since the Public Notice published in 2011 (Resolução 40/2011). The program was inserted in a consolidated policy of the MEC, the PNLD, aiming to meet the demands of social movements and of legislation, based on the argument that there are *specificities of schools in the countryside.*

Thus, this research originates in the issues related to the production of specific textbooks within the PNLD Countryside. The decision was to listen to the voice of the students who study in a school in the Settlement Agrarian Reform, and to know their point of view on this issue. Young people are understood as a social category (Castro, 2008; Dayrell, 2007). Therefore, it is important to consider the social place they live in and the conditions for their existence, determining elements of limits and possibilities for their participation in social life, of the relationships they establish with work, with their peers, with school, with their struggles and with society.

Methodological Procedures

The main objective was to analyze the presence of textbooks in school life, seeking evidence of the existence of school specificities that justify the need or not of textbooks especially produced for such students, who are Brazilian high school students living and studying in Agrarian Reform settlements. Although a strong agreement among the social movement and the researchers on the existence of specificities to be considered in the "Countryside Education", tensions and difficulties were produced from policies as the Textbook National Program for the rural areas.

Thus, the intention is to know how the young students think this issue and to search elements to justify such policies, in the rural school everyday life. Methodologically, it is a research with an ethnographic approach (Rockwell, 1997; Garcia, 2001), which suggests to articulate contributions from Sociology, Anthropology and History, in the way proposed by Schmidt and Garcia (2008) to develop "studies in cases" focusing on the relations between culture, school and teaching.

The empirical study was developed during two school years (2017 and 2018). The research strategies included: participant observation using records in the field diary; questionnaires and interviews with teachers and students; conversation circles with students; documentary analysis (PNLD legislation,

guidelines, school plans and projects, textbooks and didactic materials, among others). The data were produced gradually during the fieldwork, using the concept of methodological triangulation, aiming to capture different dimensions of the problem.

The participants were 91 high school students, aged between 16 and 27. Some of them are older than the standard high school age (15 to 17 years old). This gap between age and grade can be explained by the lack of schools of this level in rural areas of the country, which makes it difficult for young people to continue their studies after they finish elementary school. The students were the main subjects of the research, since there was interest in knowing the relationships they establish with textbooks and, in particular, understanding their point of view on the need to produce specific textbooks for students in the rural areas.

In a complementary way, 9 teachers who teach all school subjects at the Paulo Freire High School contributed with information on the ways textbooks are used in their classes, as well as their opinions on the central issue of the research - the need for specific textbooks for schools in the rural area. All of them have a degree to teach the contents of traditional curricular subjects. The results highlighted elements of the culture of the young people living in the rural areas and brought their views on the meanings of schooling and on the textbooks.

Young students, textbooks and the problem of specificities

The students attend high school classes in the school, or concomitantly with a technical course in agriculture offered by the Federal Institute of Santa Catarina. They are children of Agrarian Reform Settlement (MST) families in the region of Abelardo Luz and Passos Maia in the State of Santa Catarina (southern Brazil). Most of them (80%) work in agriculture with their parents. The majority of the students (90%) have access to internet (at home, at school or elsewhere). Most reading activities occur through Facebook messages and books they enjoy. They are interested in music as one of the main activities outside of school; 44% say they enjoy reading, but they only read what they like or what they need.

The use of textbooks

Regarding textbooks, 30% of the students indicate them as a reading material and as a resource for carrying out activities. This percentage is slightly higher than the data offered by a national survey (Failla, 2016), which shows that 21% of young people refer to textbooks as the most read type of book in the previous year. Maybe the difference could be related with the fact that in the rural areas there are not libraries and cultural centers offering books, magazines or other material for reading; thus, the textbooks

are the most available resource to read and to study. The national survey results include participants from urban areas where libraries and stores are more available.

The students pointed out that textbooks are widely used in the classroom at the request of the teacher, but a few times a week. The Mathematics textbook is the most widely used in class, followed by the Geography and History textbooks. The majority of the participants (95%) claimed to use the textbook to do activities requested by the teacher; but also reported using the textbook for interest or need: to study for tests, understanding the content, curiosity to know more things, reading texts and following explanations in class. It is important to mention that the students use the textbooks on their own initiative as well, which allows the textbook to fulfil its documentary purpose (Choppin, 2004).

For young people, textbooks can be interesting. Music is one of the elements that most attracts attention in textbooks and such interest has been found by others researchers (Chaves, 2008; Luz & Garcia, 2019). The young students said that curiosities attract them to the textbooks content and motivate their interest and they pointed out some examples to explain their understanding on this element. Among others, themes as different countries and cities are categorized as curiosities, particularly by the students who never left the settlement, never knew other places. "Make us travel to other places..." – said a student.

From the students' point of view, it would be important for elements of life and social problems to be present in the textbooks, and they understand that some textbooks already do that, enabling debates in as social themes: drug use; youth, their struggles and organizations; social movements; social inequality; internet, politics; the examination of access to higher education; healthy eating; racism; violence; behavior of youth today and in the past; preservation of the environment for the future of the Earth.

The concern about the relationship that must exist between content and life was also expressed by teachers. However, some of them emphasized that it is not the textbook that brings the relationship, and that it is up to the teacher to establish the dialogue of universal knowledge with local knowledge, a difficulty pointed out by Dayrell (2007, p. 1117), when he stated that: "[...] a large number of schools do not respond to the challenges that are set for the education of this part of the youth, [...] they have not restructured themselves to the point of creating points of dialogue with the subjects and their reality".

The data produced shows that the Paulo Freire High School has faced this challenge because it brings these young people closer to life. We should not lose sight of the fact that its origin is the struggle for the land, the action of the MST and the defense of a school with certain characteristics - despite the difficulties and contradictions imposed by reality. In this sense, it is necessary to recognize the advances that result from the choices made by this school, which can be less understood as an institution and more as the product of social construction.

The policies discussed by young students: different textbooks for rural schools?

The inclusion of Countryside Education as a specific action of a respected national program - the PNLD - meant an achievement, a result of the social movements' demands and also a result of the objective, conjunctural and organizational conditions of the country at a given historical moment. However, as textbook production is regulated by the State in its relationship with commercial publishers, problems and tensions put the PNLD Countryside into debate and motivated this research to listen to what young people think about the issue.

For 63% of the students, textbooks should be the same for countryside and urban schools: *"I think everyone should have the same textbook because everyone is looking for knowledge and it does not matter if I study in an urban or a rural school and rather, care about learning without differences."* (Student A)

One of the girls tried to clarify her opinion by citing examples of content that should be in the textbooks, not limiting herself to the debate that is held in some schools in the countryside. She stresses that the textbooks should work according to the school reality, but some important issues discussed in rural schools should be included in the urban school textbooks, reaching both places: *"I think textbooks should work according to reality, but there are some issues that are addressed that could be present in the city as well as in the countryside. Agroecology could be one of the themes to raise awareness among young people, among many others".* (Student E)

In summary, the students highlighted issues related to rural life, indicating the need to include the different realities in the construction of the knowledge of the different school subjects and, thus, inverting the logic that regulates the PNLD textbook production in Brazil, which one of the students identified saying: "the textbooks do not show as much rural life as they show urban life, that is, more attention is paid to the problems and daily life of the city and the countryside is little mentioned".

Final considerations

The research highlighted the relationships that the high school youth of a settlement establish with the school in the countryside and with the textbooks available in this school, provided by the PNLD.

The first point to highlight is that the textbooks are used in all subjects and also in an autonomous way by many students suggesting the presence of the documentary function that, according to Choppin (2004), only occurs in educational environments that stimulate the autonomy of students. This finding confirms the effects of the different forms of organization of work, which intensely encourages the participation of young students in school issues, and also in settlement issues.

A second point is that the textbooks being used in this school, in different subjects, have not taken into account the reality of the countryside. Teachers and students point out the hegemonic presence of urban

elements. Young people have revealed their perceptions of stereotypes and prejudices regarding rural residents, which are still present in textbooks, even though they have been evaluated and approved by the PNLD.

Thus, considering the different interests at stake in the discussion regarding the production of specific textbooks, it is relevant to increase the discussion on the need and precedence of producing textbooks for students in the countryside, taking the point of view of the young students of the Paulo Freire High School as a reference, as subjects who should participate in the debates and decisions about their school and their future. The students do not accept limitations regarding the knowledge they should receive. For them, the distinction should not be made by the space in which they live. Although they manifest identity/identification with life in the countryside, they also project their lives beyond the settlement where they live.

The research allows us to suggest some points that should be considered by textbook producers - editors, authors, schools and teachers – listening to the young students on their needs and preferences. Music and information about different places and ways of life are very interesting to the young students, and social problems must also be included in the textbooks, for urban and rural schools. Themes as agroecology are suggested by the students and could be privileged in the textbooks.

Finally, the research highlighted the tensions between the policies to attend specificities of schools located in rural areas showing their effects on school daily life, especially regarding the ways in which individuals evaluate such effects in their lives and projects.

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Students' use of educational resources

"We do the cleverest we can" - Adaptation strategies in first-grade pupils' preliminary reading of pedagogical screen texts

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Introduction

The aim of this article is to contribute to an understanding of first-grade pupils' engagement and meaning-making when they encounter and interact with educational screen texts during preliminary reading. Based on a classroom study (Runestad, 2015), the question "In what ways do pupils in first grade make meaning with pedagogical screen texts?" will be explored.

My curiosity regarding this question started when I was teaching at primary school, where we organized the teaching according to the Early Years Literacy Program. In this approach, small groups of pupils were circulated between different learning centres or stations, while the teacher concentrated on one little group at a time. Every 10th to 12th minute, on a signal, the pupils changed station. As a teacher, I did not have much of an idea of what the pupils actually did at the computer station.

Methodical approach

Through a qualitative classroom study (Klette, 1998) with a multiple holistic instrumental case study design (Stake, 1995; Yin, 2009), I explored the aforementioned research question. The data was collected at the computer station in a first grade classroom with twenty-five pupils over a period of five weeks. Two pedagogical screen texts were included in the study. I also collected observational data, video and screen recordings, as well as group interviews, within the frame of the Early Years Literacy Program as described above.

In order to be as faithful to the data material as possible, and to make visible the pupils´ resources, their ability and willingness to create meaning, I chose a narrative analytic approach based on Donald Polkinghorn´s differentiation of narrative configuration and analysis of narrative (Polkinghorne, 1995; Runestad, 2015: 91-99).

Theoretical framework

The definition of pedagogical screen texts in this study is based on Staffan Selander and Dagrun Skjelbred´s theory of pedagogical texts (Selander & Skjelbred, 2004). Pedagogical texts are "texts realized

in educational contexts"[33] (Selander & Skjelbred, 2004: 60). It is also based on Ture Schwebs and Hildegunn Otnes´s screen texts concept, as texts that depend on being displayed on screen to not lose any of their meaning potential as text (Schwebs & Otnes, 2006). The definition of texts also take its point of view from the theory of multimodality (Kress & Van Leeuwen, 2006), which is crucial to how reading is defined in this study. Reading in a multimodal approach is not only to read each single modality, or system of signs, but also to combine them into one entirety in the reading.

From the perspective of reception theories (Eco, 1979; Iser, 1978), I also see reading as an active creative process. Furthermore I see the social and cultural context as crucial for the pupils' process of meaning-making with the texts, cf. James Paul Gee´s primary and secondary discourses (Gee, [1990] 2008). In combination with Susanne V. Knudsen´s reader positions (Knudsen, 2009; Knudsen & Aamotsbakken, 2010) and theories of adaptation, both by Torben Weinreich (Weinreich, 2004) and Linda Hutcheon (Hutcheon & O'Flynn, 2013), I have analysed the pupils' engagement with the texts and identified different strategies of adaptation.

Results

Even if pedagogical screen texts are created and adapted to engage readers in particular ways to ensure that the learning outcomes correspond with the curriculum and the pedagogical intentions, we know that the results is not always what we expect. Pupils make meaning with texts in various ways, connected to their experiences, the text, media and the context – if they make meaning with the text at all.

The results of this study give reason to conclude that first-grade pupils are motivated to learn, and that they engage and make meaning with educational screen texts. Even when these texts appear to be rather meaningless, they stay with the texts and interact with them. They make meaning through a double adaptation, the adaptation of themselves through some ways of engagement, what Knudsen calls reader positions (Knudsen, 2009), and the adaptation of the texts through various strategies. Weinreich mentioned adaptation as a reader strategy (Weinreich, 2004), but he did not elaborate on the phenomenon. In this study, I identified seven strategies of adaptation in the pupils' use of and engagement with educational screen text.

Adaptation strategies

First of all, pupils adapted themselves to the reader positions in the texts and also to the way the texts sought to engage the readers. But when the first-grade pupils were unable to adapt themselves to

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[33] My translation

corresponding reader positions, they applied alternative adaptation strategies to make meaning with the texts. Furthermore, I will present six strategies of such adaptation of texts identified in the study.

Filling-in

In connection to the filling-in strategy, I will introduce the texts before I go any further.

The text *Safari ABC bokstavoppslag* (Kverndokken, [2002] 2006), one of two pedagogical screen texts in this study, introduced the empirical pupils to a virtual classroom containing two pupils and a teacher (fig. 1). Every lesson focused on one letter, and the content was structured in a well known progression with animations of introduction, dialogue-based lessons and tasks of different levels. The progression was slowly adapted for a child's early reading and writing.

Fig. 1

In this text, the pupils sometimes met signs and words they did not recognise. For example, "travel agency" was one of the spoken words the pupils had to recognise and then activate the correct picture card. The corresponding picture card was a logo connected to one special travel agency (ITU). The word and the picture card probably represented a gap for a young reader in his/her preliminary reading. The pupils had to explore the text to fill in the gap before they could move on in the interaction.

Gaps like these could be a way for the text to engage the reader (Iser, 1978), or it is just insufficient information in the text. The gaps sometimes occur due to pupils´ lack of understanding in meeting the text, for example, the mentioned travel agency. At other places in the text, task instructions were missing. Since the pupils had a lot of experience with similar tasks in the screen text, they already had the competence to solve the actual task and go further in the interaction. They filled in the gaps based on earlier experiences. Often they understood how to fill in the gaps because of the gaps' connection to the rest of the text. They used a kind of qualified guessing. At other times they needed help from their classmates to fill in the gaps.

The text, *10Fingre* (Wang & Wang, [1998] 2005) is another typical pedagogical screen text, but unlike *Safari ABC* there is only one way to interact with the text. The pupils were expected to read and retype words they saw on the screen. The words began appearing in a meaningless order and progressed to simple sentences (fig. 2). The initial words used a combination of only four letters and progressed to more complex words. By the end of the exercise, the pupils had used all letters of the alphabet. Here we found that the
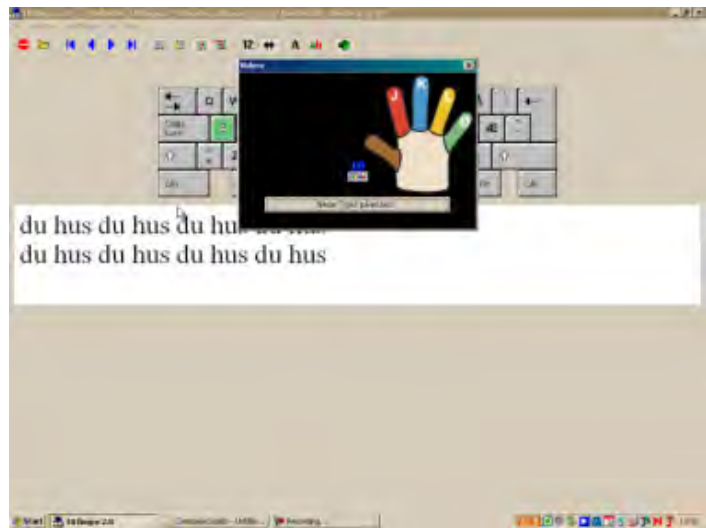

Fig. 2

pupils were simply retyping letters without paying attention to the meaning of the words they were typing. The starting node (fig. 3) in the pedagogical screen text *10Fingre* presented written text, numbers, and digital symbols and signs to their readers for selecting tasks and entering the text (fig. 3). While the marketing for *10Fingre* proclaims "learn to read and write through all senses" (MikroVerkstedet, u.å.), the pupils, who were still in their early literacy learning, really struggled to enter the text. They only had these symbols and signs to help them, and no sound or verbal instruction was given. First, they had to enter a yellow map and then a course chooser. Then, they had to choose the right course. They did not have permission to collaborate, because of the noise it would have made in the classroom. Many of the pupils needed help, and sometimes they used most of

Fig. 3

their time at the station only trying to enter the text. Without filling in the gaps, they did not get any further.

Selection

When the selection strategy was used, I found that pupils used it more while interacting with *Safari ABC bokstavoppslag* than with *10Fingre*. The progression in *Safari ABC bokstavoppslag* was, as already mentioned, slow and adapted to a child in early literacy learning. When the introduction to the actual letter in the alphabet was going on, an animation-lesson without bodily interaction started. The pupils listened to the speech from the screen text, while they looked around the classroom and at what their classmates were doing. From time to time they cast a glance at the screen, ready to enter the text when it invited them to bodily interaction. In that way, they stayed by the text and followed the screen occurrences prepared for further interaction. This kind of reading is similar to what Lise Iversen Kulbrandstad calls "skim reading" or "point reading" (Kulbrandstad, 2003). *Safari ABC* also challenged the pupils to explore and make choices.

Refunctioning

Sometimes, to make meaning, the pupils brought new elements into the texts from the context. For example, when the pupils perceived a text as boring and meaningless, some of them chose to spice it up with other elements connected to the affordance of the program – and also in combination with the situational context. Data from both the classroom observation and the group interviews showed that a small counter on the title line of the screen text *10Fingre* triggered the pupils towards an illegal, but friendly competition with their class mates. They compared how far they had come in the tasks and pointed at the counter and talked about it. They used the semiotics resources in the texts' context to make meaning, and that kind of adaptation is what I am calling refunctioning adaptation strategy: the pupils refunction the pedagogical text into a game. In group interviews, some of the pupils told me that they did not read the words, only copied the letters they were watching on the screen, and also mentioned how far they had come.

Simplification

While selection took place through more or less conscious and voluntary choices, simplification was an almost unconscious and necessary choice. Findings in the study show that students simplified the text by either ignoring words and text segments they did not understand and modalities they were unable to handle, or opted out from recommended ways of engaging.

One example was Peter, one of the boys who was really auditory weak. He interacted with the *Safari ABC bokstavoppslag* only aware of the visually signs. That became a challenge, because the instructions for the tasks were through speech. At the same time, he stayed with the text and made meaning with the other

modes in the best way that he could. Other pupils also chose to ignore some modes, and some of them also chose not to use the headset. They became confrontational and left or ignored the modes, in Knudsen´s phrasing (Knudsen, 2009; Knudsen & Aamotsbakken, 2008, 2010).

Elimination

While both selection and simplification strategies are about choosing, based on the characteristics of the chosen, conscious by selection and unconscious as by simplification, elimination is a way of interacting where the reader tries element by element, almost randomly and independently of the task texts and the context of the text elements. Some of the tasks in *Safari ABC bokstavoppslag* invited the readers to interact in this way, by exploring. For example, when the pupils interacted with the memory task, they first had to open cards without knowing what would show up, and then had to guess where a similar card could be. First, when they had opened most of the cards, they could use their ability to remember where the cards were located on the screen. Also, the tasks in *Safari ABC bokstavoppslag* had such few choices that the readers could use the elimination strategy to go further in the screen text, even if they struggled to understand the tasks.

An example of this strategy was when Ida, one of the girls, interacted with the task where she had to listen and identify the first, middle and last letter sounds in words, represented by picture cards, and sort them into three different baskets. She tried to put the cards in the baskets from left to right. If she put a card in the wrong basket, it popped up again on the screen. She did not listen to the speech in her headphones, but used the elimination strategy until all the cards were sorted in their baskets.

Without collaborating with his classmates, Peter also used the aforementioned selection strategy when he was interacting with the *Safari ABC bokstavoppslag*. As he was auditorily weak, and the tasks were so limited, it was his way of moving forward in the text when he was left to himself with the screen.

This strategy seems to be nearest to what Knudsen calls meaningless reading (Knudsen, 2009: 60). It is almost no reading at all, only bodily interaction without mental engagement. Peter seemed to use this strategy to behave like a pupil when he was in the focus of the teacher, and perhaps it was also a kind of meaning-making, but not related to the text.

Recontextualization

When texts are being transported from one medium to another, or from one context to another, Linda Hutcheon calls it recontextualization (Hutcheon & O'Flynn, 2013: 150). New meaning can appear in the new context. This may be the most relevant adaptation for pedagogical texts in education, i.e. texts being re-used and adapted by the editor or adaptor of the texts. They put the texts in a context to make them

pedagogical. Also, teachers recontextualize texts in the classroom. For example, *Safari ABC bokstavoppslag* was part of a digital teaching environment, with associated textbooks of different types. The single text was taken in its entirety and inserted into a teaching procedure that it was not meant for. In a way, they were decontextualized by the teacher, and the pupils had to create their own context to make meaning with them.

Also, the school context influences how the pupils read. They often read in a "schoolish" way, but it is not only the physical environment that makes the contexts of texts. It is also the readers´ choice of context for understanding and meaning-making. It is about which context the text is being read into. Neither the text itself nor the environmental context required collaboration between the pupils, but nevertheless they did collaborate, using their relationships with each other and their earlier experiences as contexts for the text. In this way, we can say that recontextualizatition and refunctionalization can overlap.

Sometimes the pupils also changed focus from the text, put it in the background, and concentrated on exploring the media, with the text as a kind of context.

Discussion and conclusion

All these strategies show us that first-grade pupils are willing to make meaning with texts they meet in their new educational environment, even when the texts seem meaningless. "We do the cleverest we can" was one of the statements in the interviews. The results of the study also show that pupils can make meaning far away from the pedagogical intention. This is in the context of pupils in first grade, children in early literacy learning, who were left to themselves and the pedagogical screen texts in a special, but common, way of organizing teaching.

Gee ([1990] 2008) distinguishes between primary and secondary discourses. While the primary discourse belongs to everyday life, we should expect to meet the secondary discourse at school. This discourse includes talking about and exploring language and text cultures, guided by the teacher, together within the classroom (Penne, 2012).

The results of the study show that the lack of guiding and supervision of teachers within the framework of the secondary discourse can result in what I have chosen to call *pedagogical employment*, an activity that keeps pupils employed with some kind of pedagogical tools by themselves, while the teacher performs other tasks.

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Multimodality and health education – integrating digital learning materials in primary school. A single case study of teacher, student and researcher collaboration.

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Abstract

The primary aim of this single case qualitative study was to investigate how students in one primary school project developed knowledge, skills and ownership while they engaged in the creation of multimodal and digital learning materials in the form of "games" with reference to 21st century learning skills. The secondary aim was to investigate how the group of teachers, who scaffolded students' work, developed their own didactical and digital roles and competences working as a professional learning community. The project was conducted in a public school with strong competences in applying and integrating ICT, especially in health education. The project was funded by the Danish Ministry of Education from 2018 to 2019. Results indicated that students developed knowledge, skills and ownership, which contributed to the attainment of learning goals. This result was regarded as a possible outcome of teachers' participation and collaboration in the project. A limitation of the study was the short time for observations and the fact that only one school was involved.

Introduction

This research takes as its point of departure the 21st-century need for new pedagogical and didactical methods to promote active learning and explore methods where students apply ICT to learn by the creation, production and construction of knowledge. Previously, these methods were included in the formative Unesco paper in 2015 (Scott, 2015). Moreira (2019, p. 372) summarizes how these methods are based on constructivist theory from progressive school reforms in the 19th and 20th century, represented by Dewey (1916), Freire (1970) and Vygotsky's social learning theory (Vygotsky, 1978; Kozylin, 2003). According to Moreira, these theories need to be re-interpreted in a 21st-century context and a globalized and digital world (Moreira, 2017). Moreira suggests some reference principles for the digital metamorphosis of educational material: "the educational material that apply ICT should include 'storytelling narrative', 'activation of cognitive process' and 'compel emotionally – for instance via

gamification' and apply a 'human-artifact interaction', and a 'multimedia appearance'". According to Moreira, the implementation of these principles will train students to become "educated, critical citizens prepared successfully to face the challenges of the 21st century society" (Moreira, 2019, p. 375). In this research, I will refer to these principles in the analysis of data and discussion of results from a single, unique, case study in a Danish primary school.

Background

This case study focuses on the experimental LOMA-DIGI project that was conducted in a public school, Filstedvejens skole, situated in the eastern part of Aalborg municipality in Denmark (Ruge, Møller, Mose, Mølgaard, 2020). This case was selected because it was a unique case of experimental work that could inspire other schools and lead to new pedagogical practices and cross-curricular didactics in a 21st-century learning perspective (Moreira, 2019). As a single case study, results cannot be generalized; however, it is hoped that it may spur further interest in integrated and multimodal approaches to integrate general pedagogy, didactics and health education. The LOMA-DIGI project (2018-19) was funded by the Danish Ministry of Education in order to support general innovation and the development of multimodal teaching practices that would lead to food-and-health-related action competence among Danish students (Ministry of Education, 2017). In English, this competence would be referred to as "food literacy" and include knowledge about the impact of food systems on human health, as well as skills on how to improve health and change the conventional food systems. In Danish schools, health education is generally taught as a crosscutting theme, integrated in the main subjects in the Danish Folkeskole (Public School Law, Retsinformation, 2020). The implication of this, for the LOMA-DIGI project, was the inclusion of learning goals from the following topics: Danish language, science, maths, arts, health and ICT at primary level. This kind of health education was based on a "whole school approach" and the broad, positive notion of health based on the Ottawa Charter (WHO, 1986; Health Promoting Schools Network, 2019). Filstedvejens skole previously participated in a larger school food project, 'LOMA-local food', which introduced student participation in planning, cooking and serving school food in collaboration with professionals in cross-curricular educational activities (Ruge, 2017; LOMA homepage, 2019). In 2018, the school on a regular basis applied a "1:1 computing" principle, providing each child with an iPad in lower first grade. After grade 3 level, the iPad was substituted with a PC. In order to enhance clarification, this research applies a taxonomy that divides educational materials into didactic, semantic and functional learning materials (Hansen, 2019). In this study, the online game platform serves as a didactic learning

material that frames activities[34]. The games in the platform are semantic learning materials that include pictures, students' drawings and texts. The affordance of the digital platform provided students with tools to create their own "cards and games" and served as a functional learning material. Results from previous research in the LOMA-local food education project indicated a need for increased analog and digital training activities in order to reduce the impact of inequality in students' prerequisites (Ruge, Puck & Hansen, 2017). Results from this research suggested that students from vulnerable families might obtain a higher educational outcome if their basic knowledge about, for example, fruits and vegetables, notions about farming and kitchen utensils, was at a higher level before the LOMA-project weeks were actually conducted. Following this, the LOMA-DIGI project was an experimental educational initiative to reduce inequality in learning and health among students. One of the premises for public funding was the public, online dissemination of the new learning materials on the ministerial platform by the end of the project (Materialeplatform, 2020).

Research question

The primary aim of this qualitative, single case study (Yin, 2009) was to investigate how students in a primary school project developed knowledge, skills and ownership while they engaged in creation of multimodal, semantic digital learning materials in the form of "simple" and "more complex" games. The secondary aim was to investigate how the group of teachers, who scaffolded students' work, developed their own didactical and digital roles and competences.

Thus, the aim is to answer the research questions:

1) What were the student outcomes from participation in LOMA-DIGI regarding food and health knowledge, notions and ICT literacy?

2) How did teachers develop their own didactical, digital roles and competences during their participation and how did they collaborate?

Educational activities

The educational activities consisted of six teacher-training workshops during 2017-19 (see fig.1). Ten teachers participated in workshops and the development and application of new digital learning materials, while 28 students (10-11 years old) participated in student workshops. The aim was to scaffold teachers' multimodal educational competences in order to improve student learning about food and health via analog and digital learning materials.

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[34] The software was provided by an external company: 'Serious Games' in collaboration with HistoryLab DK.

Fig 1. Timeline of project and research activity.
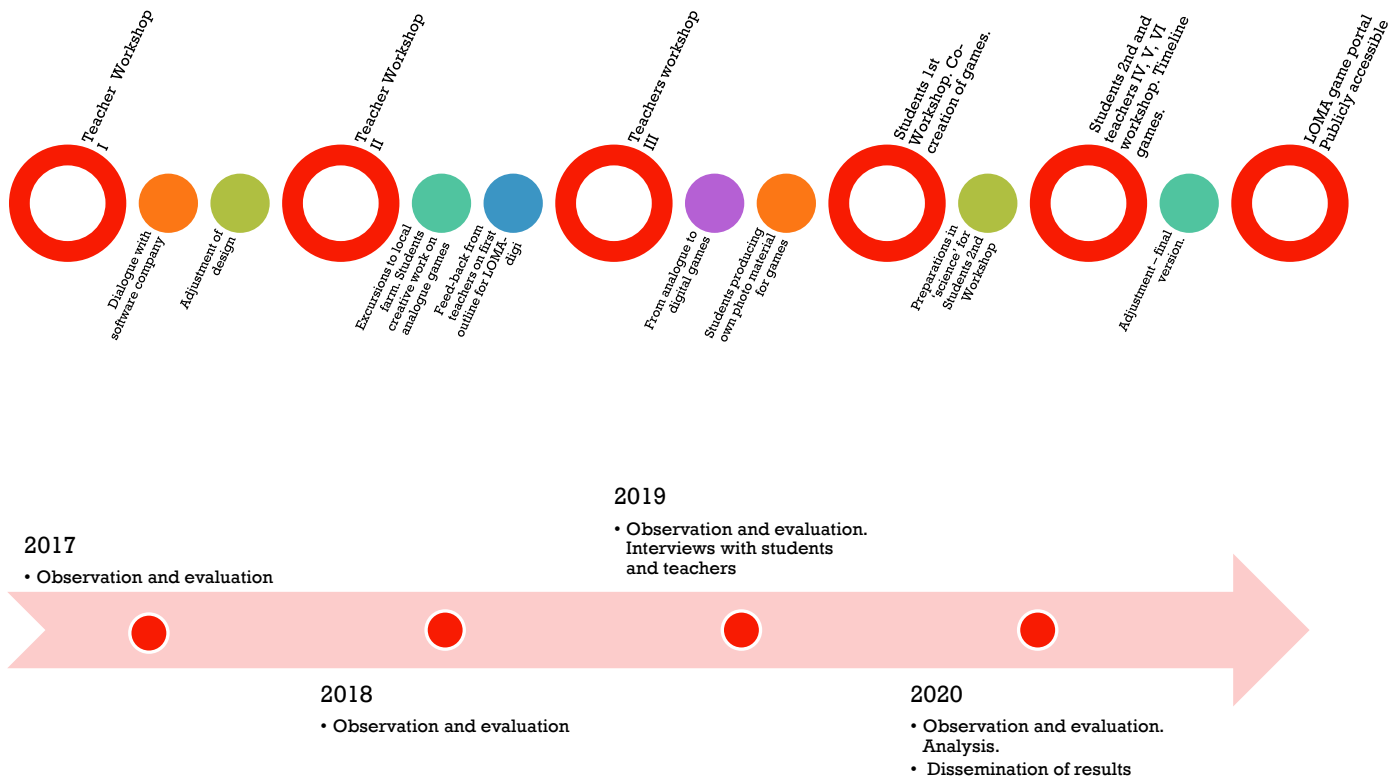
Teacher workshops

During the teacher workshops, teachers worked as developers of digital, semantic and functional learning materials. During this process, teachers trained their own creative "digital literacy" for planning lessons with games and explored their role as "game-masters" playing with students (Hanghøj, 2013). Initially, the plan was that students should include photos exclusively from online photo-platforms in order to maintain a 'aesthetically nice' appearance. Meanwhile, during the experimental teacher workshop, the competing idea occurred to let students make their own drawings and use them instead. This decision led to a turning point in the development process of semantic learning materials. When the teachers initiated this approach in class, it opened up a high level of creativity, engagement and ownership by the students, who seemed to find it exciting and emotionally "compelling" to make their own cards and play simple analog games, such as the "memory game" and "tuck box games". Based on social learning theory (Vygotsky, 1978) it was the intention that the teacher workshops would support collaboration and the interactive production of new knowledge and competences within the teacher team. This approach also applied principles from participatory action research (Baum, MacDougall, Smith, 2006), where teachers participated in the development process as researchers alongside the researchers. The teacher team

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explored various ways of working as a professional learning community (DuFour, 2004), an example of which was the de-privatisation of own education and the sharing of challenges and reflection cycles on "what works" with colleagues during teacher workshops I-VI. Based on the actual products that students had made, colleagues evaluated the first student workshops. This was combined with observations conducted by colleagues and researchers from UCL and served as the common ground for the participating teachers' collaboration on data collection, analysis, discussions and subsequent adjustments (DuFour, 2004). Additionally, teachers conducted evaluations with students after each workshop and researchers conducted focus group interviews and shared results with teachers.

Student workshops

During the first student workshop in June 2019, teachers taught students how to digitalize drawings that they had made beforehand in their Danish and arts lessons. At the workshop, the students uploaded their pictures to their individual iPad. Additionally, the teachers taught the students how to make their own "simple games" with titles and texts within the digital, didactic frame. Finally, students played their own digital(ized) games as "one player", "two players". All students reached a level of having made their own game. Some students also had time to play games that other students had made accessible on the platform. The digital learning materials corresponded with analog learning materials, such as drawings, artefacts and written texts (see illustrations: URL-LOMA-DIGI, 2020).

Results

Teacher interviews: selected results

In this section, I will include selected data and results from a semi-structured interview (Kvale, 2007) with the leading teacher for grade 3 students who participated in the educational activities. In this theme, focus was directed on the issue of differentiation in relation to students' cognitive level. The following quotation illustrates the teacher's reflections about whether the LOMA game portal functioned as a tool for including all students at a level that was relevant for their "zone of proximal development" (Vygotsky, 1978):

> *I think all kids could connect to it. No matter if you are good at ICT or just fairly good. / The LOMA game portal / provides good opportunity for differentiation. Some students can make a small memory game of 6 pieces, while others make a memory game with 9 or 12 pieces. Some students manage to create a game of "categories" too. They answer questions such as "What are fruits?" and "What are vegetables?"*

Another central theme is the cross-curricular approach and ways to integrate multiple subjects in the LOMA game platform:

> *I think the whole part where we teach ICT, it's an integral part of all our subjects here at this school. But it's a big part of it here / in the LOMA-DIGI project /. Also, "food education" is included when it comes to categories of fresh food: What kind of food is it? "Danish language" is integrated: we have the pictures, but the text needs to be written.*

The following quotation regards the teacher's reflection on the outcomes of involving students in the development process via an inquiry-based approach:

> A. *and I had not quite decided what the texts* /at the card/ *should contain. We actually figured that out with help from the kids, when they said, "Can't we write at the top what it is, and at the bottom write a little bit about it?" Another suggested that they could also write, "Well they come up off the ground." We don't push students, but we had a dialogue. Then they do it all by themselves. Every* /student/ *I talked to yesterday thought it had been super-great.*

These results indicate that teacher participation in the training workshops scaffolded teaching activities in the student workshops – with positive results. Also, there were indications that training workshops had led to mutual inspiration and self-efficacy among teachers, especially with regard to their own role in the development of multimodal teaching materials.

Student focus group interviews: selected results

Four focus group interviews with 16 students were conducted with reference to the research question. In this paper, only one selected interview is included, due to limited space. Four students participated in this semi-structured focus group interview, which was conducted after the first student workshop. Questions from the interviewer focused on student engagement, students' perceptions in their own learning, and acquisition of knowledge and skills:

S2: *I think it was fun, to make my own memory game and to play, as K said to his friends.*

I: *Okay, and what do you think? (to the student next to S2)*

S3: *It was fun when you had to take the pictures, you had to be absolutely accurate, and it was fun when you had to make such, to put them on each other, and then you could make your own memory game so everyone could try it.*

I: *Okay, and you…?*

S4: *I think it was fun to work as an ICT programmer.*

In: How did you work as an ICT programmer?

S4: Different ways….

I: Okay, but besides programming, what do you think you can learn from playing these LOMA games?

S4: Yes, a lot. I think you can learn different things. For example, you can learn your vegetables and fruits in that game, and you can just have fun with family and friends with that memory game.

I: What do you think you can learn from it?

S3: It's a bit the same.

I: What is it that you should be able to do in the memory games?

S3: You have to remember where they are, otherwise you get the wrong answer, and then it is the other's turn and then he remembers it.

I: Do you think it was easy or difficult to remember?

S3: … in the middle.

I: What do you think you can learn?

S2: I'm just thinking the same thing as the two said/…/

I: How about taking pictures and things like that, could you learn something about it?

S2: Yes, to take pictures accurately /…/

R1: You could learn to focus on the pictures.

I: /…/ What about reading and writing, can you learn this from the LOMA-games?

S1: Yes, you can learn to become better at reading.

I: How is that?

S1: Because you have to read what some vegetables and fruits are.

I: What about writing?

S2: Yes, you have to write /the names of/ the fruits and vegetables.

I: What do you think you can learn from making such a game?

S2: You can learn how to make it, how to make ICT.

I: So, to work with the computer?

S2: Yes.

I: ICT…what else can you learn?

S3: How to get smarter, you can get smarter…

I: At what…things?

S3: So, if you turn one /card/ that is not the same, then you can remember it.

I: Yes, you can train to become better at remembering.

S3: I also like to learn how to make games.

The interview illustrates how students engaged both cognitively and emotionally while they developed "games" about fruit and vegetables (food- and health-related competences). Furthermore, students experienced that they had obtained skills in ICT, which contributed to improved student learning (digital competences). Students seemed to gain significant ownership of their own games and being part of the production of educational materials (self-efficacy). Also, they indicated a high motivation for sharing their own games with their peers, as if they were proud of having produced something that would be useful for others.

Discussion, limitations and conclusions

1) What were the student outcomes from participation in LOMA-DIGI regarding food and health knowledge, notions and ICT literacy?

These students seem to have achieved learning outcomes regarding food and health knowledge, including an improved repertoire of "notions", according to themselves and to their teachers. There are indications that the students have been "trained to become educated critical citizens" despite their young age, corresponding with the reference principles raised by Moreira (2019). Self-reported student statements are generally regarded as "weak" evidence with low reliability. However, in this study, students' statements were supported by the teacher's observations and evaluations. As a unique case, it is not possible to repeat the development project in completely the same way with other participants.

2) How did teachers develop their own didactical, digital roles and competences during participation and how did they collaborate?

Teachers seem to have developed new didactical and digital literacy, new roles and competences as "game-masters" for the LOMA-game-portal, while simultaneously collaborating as a professional learning community. These findings are supported by results from survey data, analysed by descriptive statistical methods (UCL, Ruge 2020).

These results from a single case study of an action learning approach offer practical inspiration to the field, with regard to both teacher and student outcomes. Students' learning from collaborating with their teacher and their subsequent movement to the zone of proximal development is of general interest for educational institutions and for the obtainment of 21st-century learning skills. More research in a larger study would be optional. However, the research also faced major constraints at the school, mostly indicating how traditional schools work in Denmark: very tight schedules, the daily "grid", the difficulties of collaborating across classes and topics, the lack of time, the experience of being personally "disturbed" by demands for collaboration, the lack of public support for integrated school food systems, etc. It is

understandable that some teachers were skeptical at the beginning of the project. Meanwhile, after having attended the student workshop they became more positive, even enthusiastic, when they saw how students worked, liked and learned. Finally, more research is needed into the dilemma that whereas teachers may often find the pedagogy "messy", "disturbing" and "chaotic", students often find it engaging and motivating for learning and for attending school, especially when a dialogical approach is chosen as opposed to traditional "banking methods" (Freire, 2018).

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Teachers' selection and use of educational resources

The physics' textbook and the production of the real curriculum

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Abstract

Textbooks are quite present in Brazilian schools, especially public schools, supporting and guiding teachers' actions. Despite this, there has been little research, which justifies conducting research about many aspects related to textbooks. Research of an ethnographic character was carried out during the first half of 2017, which aimed to analyze the influence of the textbook on the taught curriculum of a single teacher. As an ethnographic approach, it required in-depth observation of the teacher's practices during her classes, necessitating the researcher's presence at school for a lengthy period, as argued theoretically by Rockwell (1995). Various authors were consulted on various aspects, including analysis of the textbook's effect on teaching practice (Batista, 2005), the textbook as an artifact of the teacher's control (Bonafé, 2008), as a determinant of school practices (Torres Santomé, 1998) and as a translator of the official curriculum (Sacristán, 2000). Methodologically, the research consisted of attending and recording details of classrooms and interviewing a physics teacher at a public school in Curitiba, Paraná state, Brazil (Aguiar, 2018). Four of her classes were followed, totaling 81 lessons. The research sought to understand how the textbook was introduced into class activities, the functions played by it, and inferring the pedagogical and epistemological conceptions that supported the teacher's practice. Furthermore, we also analyzed the teacher's planning, the textbooks indicated for the students' use in this planning and the teacher's own textbook as used in her classes. During the observation period, the regular presence of the textbook in classes was verified, providing theoretical support to the teacher, exercises and reading for the students, and representing a model for evaluation. The teacher's activities revealed a solid influence from a textbook that was different from the one recorded in the teacher's work plan and the one that students used regularly. Later, during the interview, the teacher answered that she was used to the oldest textbook, which reinforces the role of tradition in her activities. The results revealed that the textbook played two of the functions indicated by Choppin (2004): the referential one, using the theoretical-methodological sequence, and the instrumental one, predominant during the observed classes, through

the emphasis on proposed and solved exercises. The results also showed that the teacher used the textbook as a controlling element of classroom activities and indicating a mismatch between the relational conception of teaching, as foreseen in the teacher's planning, and the current use of the textbook, revealing the teacher's empiricist conception of teaching. In this sense, it was also apparent that the textbook used by the teacher had directional characteristics that were relevant to her conception of teaching. The research confirmed the considerable influence of the textbook on the planning and development of the real curriculum practiced by the teacher, a result that corroborates our research hypothesis that the textbook is a curricular guide in the classroom.

Keywords

physics textbook, curriculum policy, prescribed curriculum, observation research physics teaching

Introduction

Textbooks are quite present in daily school life and, due to being part of the school culture, they constitute an important element in teaching and learning. Despite this prominence in the education process, only in the past decades have they become the object of academic research, in a spectrum that begins with those researches aimed at verifying the accuracy of specific content to more recent and more complex research involving several others elements connected to politics, the publishing market and the functions of textbooks.

Being a privileged source, the textbook plays a fundamental role in the "disciplinary code" (Cuesta Fernández, 1997), contributing to the development of content and strategy for teaching and often defining what and how to teach, acting as an important instrument in the constitution of the formal curriculum.

Moreover, in the Brazilian case, textbooks' participation in the school's activity is intensified by the Nacional Program of Textbooks (PNLD), a program that evaluates, selects and distributes this material for students and teachers in public schools all over the country.

However, even considering the amount invested by PNLD and the new research possibilities, there is still little research related to the relevance of textbooks in the educational practices, as pointed out by Martinéz Bonafé e Rodriguéz (2013), who argue that this type of research should be, for example, conducted through an approach that problematizes the textbook from the perspective of curriculum theory.

Given this context, it is believed that the study of textbook use is a relevant study subject, which is why this research sought to analyze the textbook's influence on the production of the actual curriculum in a public school.

The research was designed with the hypothesis that the textbook is a resource that teachers and students have access to, constituting a curricular guide in the classroom and, even if there is a prior curriculum planning, it plays a determining role in the actual curriculum organization, compatible with the pedagogical and epistemological model on which the teacher's practice is based.

The research sought to verify the functions assumed by textbooks in the classroom, through its use; to identify which aspects of the textbook are present or absent in the teacher's planning and practice, and the pedagogical and epistemological models highlighted by the teacher in her planning and practical activities.

The textbook in the process of teaching and learning

The textbook plays important roles in teaching and learning, whether for the teacher's planning or the shaping of his or her practices by means of the activities or methodology present in the textbook, as indicated by Torres Santomé (1998), or for the student to develop their curiosity and seek new knowledge. The participation of textbooks in the organization of teaching is very important, as stated by Batista (2005), and as Bonafé (2008) affirms it also consists of an artifact that helps to control the work of teaching.

According to Morgado (2004), textbooks diffuse both the cultural selection of disciplinary programmes and the knowledge deemed necessary for the student, and are bearers of ideologies and hegemonic conceptions of the history and culture of a society.

They are artifacts of school culture that, according to Morgado (2004) have contributed to the organization of teaching and learning processes and the education system, which ultimately depends on how teachers decide or change their curricular practice, as well as the didactic resources they use.

For Morgado (2004), it is necessary for teachers to identify and analyze the factors that influence and condition the structuring of their curricular practices, in order to try to change them. In this sense, textbooks play an important role in teaching practice, because much of the school work is based on these materials.

Sacristán (2000) presents some of the reasons for how textbooks determine certain conditions for classroom teaching and learning. For him, a curriculum prescription that regulates the field of action is not very "operational" in the guidance of teachers' daily practice, while the textbook, as a pre-elaboration

of the curriculum, provides conditions that more closely reflect the teacher and the curriculum prescriptions.

In this sense, Sacristán understands that textbooks assume the role of translator of the more general curriculum prescription, since they develop the content as well as planning the teacher's practice, besides being reliable resources that inform activities for a long time. He also points out that improving textbooks can become an effective way to raise the quality of teaching and the teaching and learning process.

In the teaching and learning process, the textbook can assume, according to Choppin (2004), four functions: the referential, curricular or programmatic; the instrumental; the ideological and the documentary functions.

By assuming the referential, curricular or programmatic function, the textbook becomes a support of educational content, and a repository of the knowledge that the dominant part of society considers worth transmitting.

The textbook conveys learning practices and methods, facilitating memorization through exercises and activities through its instrumental function.

The textbook can also assume the ideological function, because with the development of the educational system, it has become one of the main vehicles of the language, culture and values of the ruling classes.

And by assuming a documentary function, the textbook allows access to a set of texts that can, with the teacher's help, develop the student's critical spirit.

Considering these aspects, it is believed that the use of the textbook in the classroom is directly related to the pedagogical and epistemological models that the teacher follows in his or her practice, considering what he or she assumes to be important in the teaching and learning relationship.

According to Becker (1993), teachers have three epistemological and pedagogical conceptions. The empiricist epistemology is supported by a directive pedagogy, corresponding to the traditional conception, in which the teacher is at the centre of the teaching and learning process, and only he or she can induce new knowledge in the student.

The aprioristic epistemology is based on non-directive pedagogy, in which the student occupies the centre of the teaching and learning process. It is an epistemology that attributes to the student characteristics that he or she does not possess, as systematized content knowledge or a capacity for abstraction.

And lastly, constructivist epistemology is based on a relational pedagogy in which the teacher–student relationship is at the centre of the teaching and learning process and in which both bring their experiences to the classroom.

Approaching the classroom through an ethnographic approach

Given the proposed objectives for the research, the ethnographic approach was chosen, because, according to Rockwell (1995), only a daily and prolonged approximation of the classroom would allow us to witness the aspects related to the use of the textbook by the teacher and students and the possible relations with the developed curriculum.

To comply with the methodological assumptions of ethnography, classroom monitoring was conducted over a period of three months, during which the interaction between the agents was observed and recorded to seek a greater – or at least distinct – understanding, of the processes involved in the relationship of teachers and students with the textbook.

The research followed a physics teacher from a public school in the state of Paraná, during a total of 81 classes taught to first and second year high school classes[35]. In addition to classroom observations, there was interaction with the teacher during breaks and interviews, which provided further research support. During the follow-up, the teacher's speech was observed, the way she presented the content, her interactions with the students and the moments in which the textbook was present in the classroom.

At the same time, a comparison was made with what was proposed in the teacher's planning[36] and what was seen in the classroom, in order to understand the role of the textbook in the relationship between the taught curriculum and the planned curriculum.

Some evidence and analysis of empirical observations

In the classroom, teacher Neusa[37] always brought and used two textbooks from the same author[38] but different editions. The oldest, from 2001, called *Complete Physics*, and the second newer one, from 2013, entitled *Physics*[39], selected by PNLD 2015. The 2001 edition was for the exclusive use of Neusa while the 2013 edition was the version to which all students had access. Although the two textbooks were prepared by the same group of authors, their editions are quite different, since the older one was written when there was no PNLD for physics textbooks, and thus did not undergo the evaluation of this Program, unlike the 2013 edition.

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[35] Students aged approximately 15 to 17 years.

[36] The teacher's planning was recorded in a document called the Teaching Work Plan - PTD.

[37] Fictitious name given to the teacher, in honor of a Brazilian researcher, Neusa Amato, one of the pioneers of physics in the country.

[38] The textbooks used were: *Física Completa* (2001) by Regina Azenha Borjorno, José Roberto Bonjorno, Valter Bonjorno & Clinton Marcico Ramos; and *Física* (2013) by José Roberto Bonjorno, Regina de Fátima Souza Azenha Bonjorno, Valter Bonjorno, Clinton Marcico Ramos, Eduardo de Pinho & Renato Casemiro.

[39] In this text, the 2001 edition will be referred to as Bonjorno (2001) and the 2013 edition as Bonjorno (2013).

The 2001 edition of the textbook has a propaedeutic and directive characteristic. The organization of the chapters consists of the summary presentation of the content to be developed, the presentation of the basic equations related to this content, some solved exercises of immediate application of the equations and proposed exercises. The textbook end with a series of exercises applied in college entrance exams from several Brazilian universities. The 2013 edition, besides repeating this basic structure, presents reading boxes, contextualized questions, notes about the history of science and suggestions for experiments. However, quantitatively, the solved and proposed exercises occupy most of the units.

In addition to the differences in the two textbooks, there were also differences in their uses. Neusa used the 2001 edition to copy content on the board and provide example exercises, while the 2013 edition was used by students to follow the content, as the textbooks were similar in this respect, and to perform readings and homework.

During the interview, the teacher said she had been using the 2001 edition for a long time, and explained that she liked its programmatic sequence, which provides students with an easy understanding. Thus, it was possible to realize that there is a tradition, on the part of the teacher using this textbook, that she is already used to the way it presents itself.

The textbook copy used by the teacher showed very noticeable signs of use. It was full of adhesive notes indicating which exercises and content she uses, including its curriculum programming, and which parts she does not.

The teaching work plan

In the analysis of the teaching work plan (PTD), which aims to compare the planned and the taught curriculum, some divergences were found, including a third textbook, *Physics in Context*, by Pietrocola et al (2013), which was not present at any moment of the observation. This textbook has a very different programme content compared to Bonjorno (2013): the first volume of Bonjorno includes six units: physical science; scalar kinematics; vectorial kinematics; dynamics; static; and fluid mechanics. Pietrocola (2013), on the other hand, has four units: bases of scientific knowledge; kinematics - movement and its description; dynamics - movement and its cause; and astronomy. In Pietrocola (2013) there are three units: energy; heat; sound and image, while the second volume of Bonjorno (2013) is divided into four units: thermology; thermodynamics; optics, wave.

Analyzing the content, it is possible to notice that the similarity between the two textbooks is greater in their first volume, while the differences between the second volumes are much more evident and divergent.

Pietrocola (2013) presents a relational view of teaching, where teacher and student bring their experiences to the classroom, contrary to what was observed in the classroom, where the teacher occupied the central role, more appropriate to the proposed by Bonjorno (2013), who is more directive, corroborating the empiricist epistemology of the practice.

The teacher's practice was characterized as an empiricist epistemology, according to the evidence shown during her action, manifested, for example, by the way she kept control of the class; by requiring a notebook with all activity recorded as a means of evaluation; when performing an assessment based on the textbook; and in determining classroom times for response, reflection, and discussion.

The way in which she used the textbook also points to this epistemology, as the authors of Bonjorno (2013) explain that reflection and interdisciplinarity should be part of the teacher's responsibility, removing this burden from the textbook. Thus, by preferring certain aspects to others in the textbook, such as a greater emphasis on exercises, the teacher reinforces the directivism of the textbook in her classroom action.

Some aspects of teacher Neusa's academic and professional career may explain her options. Neusa completed her basic education at a private school, graduated in physics from a public university and completed another undergraduate degree. She has been teaching physics at high school for more than 20 years, having started her teaching activities at undergraduate level. Her weekly workload was quite intense, teaching at three different colleges in distant locations in the three shifts of the day, which may perhaps justify her practice of tending to an empiricist epistemology associated with the propaedeutic use of the textbook.

In this sense, Neusa declares that she uses the Bonjorno textbook because it is the one that identifies the most with her approach, emphasizing that, regardless of epistemology, a good job can be done as long as there is a high consonance between the teacher and the materials she uses.

Conclusions

During the observation period, it was possible to verify the influence of the textbooks in the development of the activities of teacher Neusa. Using them as support, she organized her planning and developed her actual curriculum, so that, in her practice, the textbooks fundamentally performed, according to Choppin (2004), the referential and instrumental functions.

By serving as a basis for planning and showing support for content deemed important to be transmitted, textbooks played a referential function. At the same time, in the classroom and in activities with students, for facilitating memorization and promoting repetitive learning, the instrumental function of these materials was evidenced. This finding agrees with the tradition of teaching physics, which in Brazil is

characterized by a more propaedeutic teaching, where the textbook ends up outlining the contents to be addressed, and its greatest use is aimed at solving exercises, and corroborates research carried out in Brazil by authors such as Martins and Garcia (2014) and Artuso (2012), who also showed that the referential and instrumental functions of textbooks are the most present in the teaching of physics in the classroom. Historically, the teaching of physics has been developed as an encyclopedic and propaedeutic model, concerned with problem solving, not emphasizing, in general, the social and historical context of knowledge, aspects recommended by current research, including elements indicated in the selection criteria for PNLD textbooks.

On the other hand, when the teacher chooses to develop her activities based on authors who approach the study of physics in a directive manner, and declares that she feels more confident when using them, the teacher shows agreement with this trend. This demonstrates that there is also an epistemological and pedagogical agreement between their actions and the purpose of the textbooks used.

This option confirms the observation of Aguiar (2018), according to which the textbooks selected by the teacher are adequate to her epistemological and pedagogical conceptions. Thus, it can be said that there is a reciprocity in the choice of the textbook by the teacher. While she chooses the textbook, the textbook also symbolically chooses her.

Finally, when verifying that the textbook was present in the teacher's planning and that at various times its approach guided the exercises, content, assessment, readings, debates and reflections, it was possible to confirm the hypothesis that, for her, the textbook is a curriculum guide, which guides the realization of the taught curriculum and the reproduction of the planned curriculum.

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New resources creating tensions in teachers' activity:
The case of the Education Through Research model
and the Student-Researcher Digital Notebook

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Abstract

This article focuses on the tensions created in teachers' activity by the uses of a symbolic instrument – an inquiry-based method called the Education Through Research model – and a digital one – the Student-Researcher Digital Notebook, designed to implement the model. Our research was guided by the following questions: How did teachers use these instruments to conduct their own class project and achieve their learning objectives? What kind of contradictions did the introduction of these resources lead to, and how did teachers try to overcome them? We collected data on the instruments and their uses through document analysis, interviews with the teachers as well as observations carried out in the classrooms. We analyzed data using Engeström's activity theory framework (1987) in order to understand the contradictions within teachers' activity created by the introduction of each instrument. Our main results indicate that both the ETR model and the SRDN first tend to disturb teachers' activity but then allow them to either carry out and change their practices or legitimate their pre-existing practices.

Keywords

Educational resources, science education, digital tool, inquiry-based learning

Research context: creating a digital tool to implement an inquiry-based approach
Les Savanturiers and their Education Through Research model

Les Savanturiers is a French science education program created in 2013 by a former elementary school teacher which aims to help and support the implementation of science projects in elementary and secondary schools by teachers. Each project lasts 10–15 weeks and is mentored by a researcher (Carosin & Demeuse, 2018; Les Savanturiers, 2016, 2018). Teachers are encouraged to follow a specific inquiry-

based approach – created by Les Savanturiers – called the Education Through Research (ETR) model, which notably includes the following eight steps:
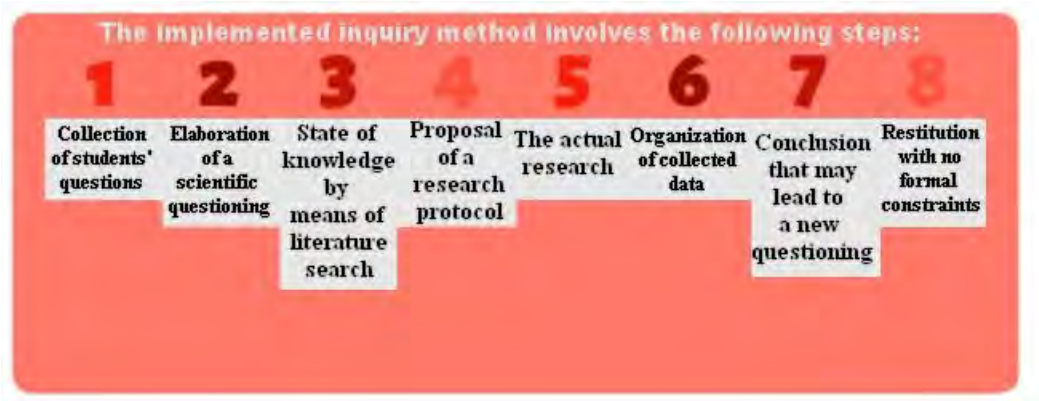

Figure 4: Diagram of the 8-step model (Les Savanturiers, 2016)

This differs from other inquiry-based approaches (Calmettes, 2012) by starting directly with the collection of students' questions without presenting a problem or situation beforehand and by not included the elaboration of hypothesis explicitly in the model. The ETR model is also flexible, as it encompasses a wide range of different ideas and concepts, such as having experts mentoring class projects, promoting collaboration among students, fostering creativity and critical thinking skills, trying to adopt the attitude of a researcher, or following the eight steps. Teachers are thus encouraged to adapt elements of this approach to their own practice.

In order to instrument the ETR model, a digital tool was designed.

Designing the Student-Researcher Digital Notebook (SRDN)

In 2016, Les Savanturiers answered a call for proposals[40] to design an inquiry-based learning environment to implement teachers' projects in the classroom (Caisse des dépôts et Consignations, 2016b). Working in a consortium involving researchers, regional education authorities, teachers and educational software developers, they designed a digital tool called the Student-Researcher Digital Notebook (SRDN).

The SRDN was conceived to structure an inquiry-based approach, enabling students to work collaboratively and allowing teachers to use only some functionalities that they consider appropriate for their project (Cisel, 2018). The SRDN is a web application composed of several modules that can be used independently of one another. It contains a brainstorming module to write proposals and categorize them, a document storage and sharing module, a form module where teachers can send questions to

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[40] The e-FRAN call for proposals was launched by the French Ministry of Education to promote the design of educational digital tools by consortia comprised of various private and public (Caisse des dépôts et Consignations, 2016a; Cisel et al., 2017)

students and a research follow-up space designed to enable students to produce structured writings by following a step-by-step process. Two paths are offered: the researcher path – which includes the following sections: question, hypothesis, protocol, data, results – and the engineer path – containing the following: technical problem, technical solution, protocol, results and conclusion.

The research follow-up space contains a "research sheet" that any student belonging to the same group can modify and where teachers can add comments, validate or close each section. This part of the SRDN also contains a module called the "research draft" that is individual and where students can access several scaffoldings (Bruner, 1983) to improve their own writings.

Figure 5 The links between the 8 steps model and the SRDN modules

When comparing the 8-step model and the SRDN, we notice that some steps can be implemented through several modules, whereas some elements are missing in the digital tool: notably, no space is dedicated to the mentor. Also, some elements, such as the engineer path, can be found in the application but not the model.

Thus, the ETR model and the SRDN only partially match each other and the discrepancies between the instruments can be a source of tension. This begs the questions: how did teachers use these resources and what kind of difficulties did they encounter?

Framework and research question

We studied the uses of the ETR model and the SRDN through Engeström's activity theory framework (1987). According to this theory, activity is considered in a systemic way, as a whole composed of several interconnected elements (Engeström, 2011): the subject of the activity, its object, the instruments used, the community engaged in this activity, its division of labor and the rules regulating the activity.

Activity systems are dynamic since they contain internal tensions, called contradictions, which are a source of change because subjects will try to overcome them. Engeström argues that four levels of

contradiction exist in activity systems: primary contradictions, resulting from a tension within a component of the system; secondary contradictions, arising when two different components conflict with one another; tertiary contradictions, occurring when tension arises between new and old elements of an activity system; and quaternary contradictions, stemming from conflicts between different activity systems.

As instruments within a teacher's activity system, the introduction of the ETR model and/or the SRDN may lead to various contradictions. Since the ETR model and the SRDN are both adaptable resources and the French education system allows teachers significant pedagogical freedom, a multiplicity of uses are possible. Therefore, our research was guided by the following questions: how did teachers use these instruments to conduct their own class project and achieve their learning objectives? What kind of contradictions did the introduction of these resources lead to, and how did teachers try to overcome them?

To answer these questions, we collected various data on several class projects following the ETR model and implemented by the SRDN.

Methodology

We used a combination of qualitative methods (Van Campenhoudt et al., 2017) to collect data about the instruments and their uses by teachers.

First, we carried out a document analysis (Bowen, 2009) about the ETR model, the design of the SRDN as well as the links and discrepancies between the two instruments. The corpus of documents included the pages of the Savanturiers' website, the *vademecum* and guides created by the programme, and the application itself.

To get an overview of the various contexts in which the SRDN was being tested, we visited eight different classrooms and noticed how varied their situations were. Concerning the educational context, some schools were comprised of academically successful students while others were struggling schools. The grade levels were varied too: the youngest students were in primary school (age 7) and the oldest were in higher education (age 19). Class projects were quite different too, in the subjects and in the pedagogical objectives set by teachers.

We then selected four projects based on a variety of criteria – context, grade level, type of project – and implemented a longitudinal follow-up based on observations of these four classes, representing more than 30 hours of observation. This enabled us to get information about the projects' proceedings, the activities carried out, the resources used, the modules of the SRDN used, and the difficulties encountered.

After each session, we talked with the teachers to find out more about their perception of the instruments. We also carried out seven semi-structured interviews with teachers, with an average duration of 50 minutes, to find out more about their motivations for taking part in the project, their pedagogical objectives and their uses of the SRDN outside the classroom, mainly to prepare their lessons.

The qualitative material thereby collected enabled us to get numerous data about the uses of the instruments, the context of use, and the purpose for which they were used (Cisel et al., 2019).

Results: tensions in teachers' activity and partial appropriations

We use the term "tension" to refer to various kind of difficulties encountered by teachers, going from simple software malfunctions to contradictions, in the sense of Engeström's theory.

User tests, an example of one activity system

In the context of the research project surrounding the design of the SRDN, the uses of the application by teachers and students in their class were user tests. From the point of view of teachers, we can model the user tests according to the following activity system:
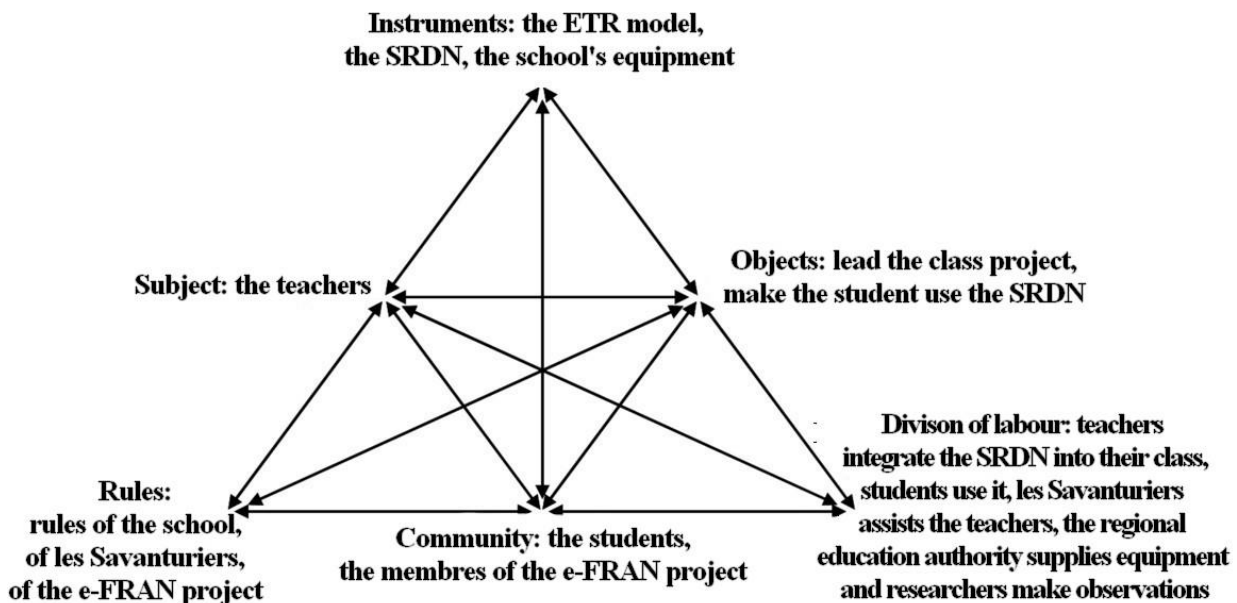
Figure 6 The user tests activity system

This model helps us visualize the elements of the activity and how they can lead to contradictions. We first noticed a primary contradiction in the object of the activity: teachers were torn between leading their project and using the SRDN to help designers identify bugs, creating situations where the application was used without any pedagogical objectives. Another primary contradiction was identified within the instrument node: to use the application, computers or tablets with Internet access are necessary, yet most

schools encountered connectivity issues. To overcome this contradiction, some teachers came up with a circumvention scheme, like sharing a smartphone connection or relying on the regional education authority to supply additional equipment such as hotspots. Others had a backup plan that did not involve using the SRDN.

This kind of difficulty reflects the need for schools to have reliable computer infrastructure for teachers to be able to use online resources like the SRDN. Because of this, the SRDN sometimes had a disrupting role in teacher and class activity.

Another source of difficulties was that the SRDN was still a prototype at the time of the research and had technical problems. The SRDN creation timeline did not match with the school calendar.

The design also took longer than initially planned. Therefore, the SRDN was not finished when schools tested it and still had several bugs, which had repercussions on class activities. We can analyze this as a form of quaternary contradiction between the teachers' activity system and the consortium's activity system for developing the application.

Using this method of analysis, we got several research results regarding the contradictions induced by the use of the SRDN and the ETR model. In the following section we present a synthesis of our main results.

New instruments creating tensions

We noticed that the SRDN did not replace the other resources that teachers usually used, like blank sheets and photocopies, and we witnessed a hybridization between paper resources and digital resources. For example, in most classes, students would write down their proposition in their notebook and the write them a second time in the SRDN. Consequently, using the SRDN meant adding another instrument to the activity, which does not necessarily lead to a contradiction but complicates the activity. Moreover, as the application contains numerous functionalities, navigation could be complicated and when no time was dedicated to showing the class how to use the instrument, students would incessantly call their teacher for help. This can be seen as a secondary contradiction between the students – who are part of the community of teachers' activity – and the SRDN, an instrument. The application is ill-suited for struggling students and even for independent students, and getting familiar with it requires substantial time, which is therefore dedicated to learning how to use the SRDN instead of engaging in other learning activities.

Apparently, no class used the SRDN to keep records of data or results analysis. One reason for this is a secondary contradiction between the instrument and the rules of the activity – the duration of the projects and the school calendar. Typing on a computer or tablet can be quite time-consuming for young students and, as not much time is left at the end of projects, teachers prefer students to write on paper instead.

The scaffoldings of the research draft were also rarely used, due to another secondary contradiction between the instrument and the subject – the teachers – as their pedagogical objectives did not match the purpose of the scaffoldings. Primary school teachers mentioned that it is too ambitious to teach young students about scientific reasoning. Secondary school teachers explained that they did not have enough teaching time to focus on scientific arguments.

Through our study of the instrumented projects, we also got a better understanding of the way teachers perceive the ETR model and how it was implemented. It is the use of a digital resource that helped us understand the use of the symbolic resource and its contradictions.

Surprisingly, no class exactly followed the 8-step model in their project. Teachers would add new steps or skip some. For example, one teacher imposed the research question, while another added an activity before collecting students' questions to trigger their questioning. When we interviewed teachers, we realized most of them barely knew what the eight steps were, and had different conceptions of what the ETR model encompasses. For some, it essentially meant stimulating students' questioning, while for others it was about formulating hypotheses and conducting experiments. Confronted with the heterogeneous nature of teachers' conceptions of the ETR model, it seems difficult to talk about appropriations of the model as whole.

We can interrogate the reasons why the model is not implemented as a whole in the classroom in its current form. And it appears that the current ETR model, instead of facilitating teachers' activity, tends to disturb it when the 8-step model is followed, because it contains various internal contradictions.

The first contradiction is due to the contrast of the approach of the model and the non-directivity principle, which states that teachers are free to modify elements as they wish. This creates a primary contradiction within this symbolic instrument: if teachers can change several parts of the model and still call it the ETR model, then the model has no core and anyone can develop their own conception of this symbolic instrument. This gives the impression that teachers are using the same resources when sometimes they are not.

The other contradictions are mainly secondary contradictions.

Teachers did not receive any training on how to implement the ETR model and therefore developed confused conceptions of what the ETR model is supposed to be, which can be seen as a contradiction between subject – the teachers – and the instrument. The model also conflicts with the community node – the students – at two stages: the first step of the projects is supposed to be the collections of students' questions, but this assumes that students already have questions on the topic before starting the project, which is rarely the case. When implemented as it is, as we have observed, students simply do not know what to say or write. Most teachers overcame this contradiction by presenting a problem or trigger

situation to foster students' questioning before collecting their questions. The other difficult moment is the literature search, because this can be quite complicated and time-consuming for students to search for relevant information. To overcome this contradiction, some teachers selected documents themselves and gave them to their students instead of doing a real literature search. Others put the literature search at the center of their project and made students use this search to answer their questions instead of setting up experiments.

Another secondary contradiction arose between the community – the mentor – and the subject – the teachers. The mentor role is not clearly defined in the ETR model and so their implications varied from one project to another, sometimes disturbing the activity of teachers who were expecting them to be more involved, to propose activities and so on.

These tensions highlight the flaws in the ETR model and why some changes were necessary for this symbolic instrument to be used in the classroom.

Despite these contradictions, teachers managed to use both instruments to lead their projects, revealing the benefits they can offer.

Some benefits and appropriations

The SRDN was mostly used during the first steps of the projects and for specific purposes: to collect students' ideas or questions, to save documents found online and for the teacher to share documents with the whole class. Several teachers also used the SRDN to instrument the formulation of research questions, hypothesis and protocols. These uses were intended and expected. We also witnessed some diversions from the SRDN: for example, one teacher used the brainstorming module to work on students' grammar mistakes in their question formulation. As this kind of use was not intended when the application was designed, this reflects the personal use of the teachers. During interviews, these teachers explained that they had decided on their pedagogical objectives beforehand and adapted the instrument to try and achieve them. Therefore, we can consider that these diversions are a sign of appropriation.

Several teachers considered that one of the advantages of the application is to facilitate class management since it gathers various tools together and allows them to see and comment quickly on students' writings, synchronously or asynchronously. These benefits are not specific to the SRDN and can be found in other digital tools. On the contrary, the advantages of the research sheet are more specific: teachers praised this module for enabling them and their students to visualize their progress in their projects and for structuring students' approach while keeping clean and organized tracks of the work done.

Regarding the ETR model, we noticed adaptations of elements drawn from the model. For instance, one primary school teacher made his students write blog posts about their project because one element

mentioned in the ETR model is communicating about one's research. The vague nature of the model enables flexibility, which some teachers take advantage of to innovate in their classroom and create new activities.

During interviews, some teachers said they had joined the Savanturiers to change their practices, and the introduction of the ETR model helped them achieve that goal when they managed to overcome the induced contradictions. Other teachers enrolled in the program because they already had a project idea and were looking for a recognized framework to work in. In this case, the resource did not change their activity and teachers relied on the flexible aspect of the ETR model to adapt it to their own existing practices.

Conclusion

The introduction of the instruments did not modify teachers' pedagogical objectives, but it changed the way they tried to achieve them. Theses changes were different for each teacher, depending on their usual personal teaching methods. For most primary school teachers, the biggest change was using digital tools with their students and making them write using tablets or computers. To other teachers, the challenge was to make their students search for information instead of giving it to them right away.

As far as the ETR model is concerned, our research underlines that ill-defined models lead to tensions in subjects' activity and create difficulties for those who wish to appropriate them. Nevertheless, concurrently, the open and flexible nature of the ETR model enables the Savanturiers program to recruit very different teachers and give them a formally recognized space to develop innovative projects, try new practices, or legitimize their existing practices.

The design and use of the SRDN helped us reveal tensions in the ETR model that were inconspicuous until then. Most of the adaptations of the model that teachers made in their classrooms could not be translated in the SRDN. Therefore, we saw how the reification of a flexible model in a more rigid resource lead to various contradictions, which impacted teachers' activity.

Regarding the SRDN, the observed uses were coherent with the consortium's intentions. However, a significant part of the application's benefits was not specific to this instrument, which questions its relevance compared to other digital tools that teachers are already familiar with. Moreover, the mastery of the SRDN requires a lot of time, which can be an obstacle to its appropriation by teachers and students. These aspects should be considered when designing new educational tools or when choosing an existing instrument for the classroom.

At the start of the 2019 school year, the SRDN was made available to all teachers outside of the Savanturiers program. This raises the question of the new uses or diversions that will be made and opens

up new research perspectives. Another possible continuation of this research could be to study the training courses and materials created by Les Savanturiers and see how taking part in this training influences teacher's teaching methods and objectives.

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Discourses of Danish as a subject on learning platforms: didactic analysis of courses for Danish L1 teaching

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Abstract

In this article, we present a study of Danish L1 teachers' use of the learning management system Meebook in relation to their design of courses for Danish L1 teaching. The courses are analyzed from a subject-didactic approach in which we look at discourses of Danish as a subject in the L1-courses. Through this analysis we shed light on which L1 subject and which Danish L1 discourses appear in teachers' work.

Introduction

Learning platforms set a new context for teachers' planning of teaching and establishing learning spaces in L1 teaching. This implies, as Professor Ellen Krogh says, "When a subject is brought into new contexts, it means that the subjects must be disseminated and communicated, discussed and legitimized." (Krogh, 2011, p. 39). The teachers' work in producing teaching courses reflects both how teachers understand Danish as a subject and how they practice and do teaching in Danish as a subject. Throughout the courses, one can observe how teachers position Danish as a subject with

learning platforms as context. The different courses point to a particular didactic culture of Danish as a subject, i.e. shared notions of what Danish as a subject is and how the subject can be practiced in the new context that a learning platform represents.

The research question for this article is thus twofold: First, the intention is to describe and map how L1 teachers use learning platforms as a didactic tool, i.e. what types of didactic designs can we see that teachers produce? Second, we are interested in studying which versions of Danish as a subject emerge in these didactic designs, including a discussion about whether learning platforms have the potential to develop new types of didactic designs and innovative teaching. Our understanding of Danish as a subject is based on four positions: Danish as basic subject, Danish as an identity subject, Danish as a creativity subject and Danish as a communication subject.

Method

The study's empirical data consists of the 37 most frequently downloaded Danish academic courses that we identified in the learning platform Meebook on 18.8.2017. Meebook has a tool for designing courses, a "course builder" (Figure 7).

Figure 7. The course designer in Meebook. The teacher can create chapters and insert different blocks of content: for example images, links to internet resources, embed video, and links to digital learning materials.

Using the course builder, a teacher can create courses (Figure 8) that consist of:

- chapters and blocks with different types of content: text, fixed images, video, PDF files and links to e.g. Google Drive
- assignments
- publisher-produced teaching materials
- evaluation tasks

Figure 8. Example of a course in Meebook. In this part of the course, the student is introduced to and works with substantives.

These courses are our data and can be characterized as Internet resources and didactic documents, which are neither produced by us as investigators nor produced for this study. Basically, documents have an ontological status that reflects a concrete reality, but at the same time they are also written with a specific purpose – and should be seen in a larger context. Documents can be seen as social facts or constructions:

> *Documents can tell us a lot about a social setting or an individual life. However, we have to approach the analysis of documents for what they are and for what they are used to accomplish. This means paying attention to the knowledge that documents "contain" about a setting, but also examining their role and place in settings, the cultural values attached to them, their distinctive types and forms.* (Coffey, 2014, p. 372)

To understand the didactic designs, we must also see them in relation to the specific context in which they are produced and used. Here, we do not go into the individual teacher's context, but see the didactic documents as representations of a typical planning context of courses in learning platforms. Our approach to didactic design is that they represent an underlying academic notion and practice of the concrete teachers, who in turn represent L1 teachers as a group in the school. The didactic designs thus reflect how teachers think about subjects, how they think about learning platforms, and how they think about teaching; they can be seen as an expression of an underlying L1 teacher culture's approach to using learning platforms.

Didactic design and discourses as study object

A didactic design reflects the teacher's understanding of subjects and teaching. For example, a teacher could understand Danish as a subject that aims to develop students' interpretative and meaning-creating competence, their creative competence, their communicative competence and/or basically socialize them into an understanding of languages and texts. A subject didactic analysis examines which subject didactic choices a teacher has made in planning a course of instruction. In this analysis, we wish to study which kind of discourses of Danish as a subject we can see in the courses.

Discourses are an approach to understanding teachers' professional understanding. Gee (1990) defines discourses as:

ways of behaving, interacting, valuing, thinking, believing, speaking and often reading and writing that are accepted as instantiations of particular roles by specific groups of people. (...) They are always and everywhere social. Language, as well as literacy, is always and everywhere integrated and relative to social practices constituting particular Discourses. (Gee, 1990, s. xix)

Discourses of Danish as a subject are in the analysis used in extension of Gee's definition as an analytical method to investigate how L1 teachers perceive the Danish subject as a way to talk about and value Danish as a subject that exists within the social practice that teaching, and the teaching profession, constitutes. L1 teachers have as a permanent task to interpret and implement what is important in the Danish subject and thus construct the Danish subject through their teaching. The discourse analysis cannot say anything about how L1 teachers explicitly interpret Danish as subject – they have not been asked how they see the Danish subject, but the analysis is our interpretation of the patterns we see in the teachers' didactical practice. The analysis is thus based on a translation of the L1 teachers' manifestations of their didactic practice and their work in designing and building learning processes through the medium of the learning platform.

Theoretically, the discourse analysis is grounded in the four subject discourses presented in the book *Danish as a teaching subject* (Hansen, 2012): Danish as an identity subject, Danish as a communication subject, Danish as a creative subject and Danish as basic subject. The four subject discourses identify different ways of understanding Danish as a subject, and the identification of each of the discourses can be found in the purpose of the curriculum of Danish as a subject. The individual discourse also identifies specific competences that the student is expected to acquire, specific areas of expertise and specific activities. The four subject discourses are based on the fact that Danish as a subject is a subject about texts, where texts form the material core, of which different competences emerge: "The purpose of Danish as a subject is to teach students to reflect on and consciously interact with texts. They must experience texts, play with texts, examine texts, understand texts, read texts, be inspired and provoked by texts and learn to evaluate texts" (Hansen, 2012, p. 13).

The purpose of Danish as a subject-centered curriculum is:

The students shall in Danish as a subject promote their experience and understanding of literature and other aesthetic texts, professional texts, languages and communication as sources of development of personal and cultural identity. The subject should promote the students' empowerment and their aesthetic, ethical and historical understanding.

> *PCS. 2. Students in Danish as a subject shall strengthen their mastery of the language and promote their passion to use the language personally and well-balanced in interaction with others. Students must develop an open and analytical approach to the forms of expression of contemporary and other periods and cultures. The students in Danish as a subject must develop their expression and reading pleasure and qualify their empathy and insight into literature and other aesthetic texts, professional texts, language and communication.*
>
> *PCS. 3. Students must in Danish as a subject have access to the Scandinavian languages and the Nordic cultural community.*

In the following sections, we define each of the four discourses and exemplify them with occurrences from the analyzed courses from Meebook.

Danish as an identity subject relates to the role of texts as "sources of development of personal and cultural identity", which can thus "promote students' empowerment and their aesthetic, ethical and historical understanding" (Hansen, 2012). The special potential of texts as sources to develop personal and cultural identity is that texts by their language, their content and specific life images can engage students and enable the development of their aesthetic, ethical and historical references. In particular, fictional texts can open students' eyes to these perspectives. Through work on texts, the goal is also to strengthen students' hermeneutic text interpretation, i.e. experience of and grasp and understanding of the aesthetic-, ethic- and history aspects of texts.

Discourse of Danish as a subject	Indicators	Example
Danish as an identity subject	Texts are used in ways that can enhance students' identity, their aesthetic, ethical and historical references and hermeneutic text interpretation.	In the Kim Fupz Aakeson course (a writer of children's books) the teacher writes an introductory sentence: "We have to work with the author's language, manner of writing and especially his fun morals."

Danish as a communication subject shall strengthen students' mastery of the language and promote their desire to use the language personally and well-balanced in interaction with others, as formulated in the purpose. The students must develop communicative skills to communicate with and through texts and

to learn to participate in communicative situations where they debate, exchange views and create meaning and opinions.

Discourse of Danish as a subject	Indicators	Example
Danish as a communication subject	The focus is on strengthening students' communicative skills.	In the Fixed Advertising course, students are presented with the following assignment after being taught about various aspects of the genre: "Find a good idea for your advertising. It is important to find out which product you want to advertise. Find audience and create a good image. Remember the slogan and text. Use the Minerva model."

Danish as a creative subject is focusing on strengthening students' creative skills and "developing their expression and reading pleasure" (Hansen, 2012). The students here must learn how to create texts and manage writing and the production process from idea to finished text.

Discourse of Danish as a subject	Indicators	Example
Danish as a creative subject	The focus is on strengthening students' creative skills and expression through text production.	The Heroes course includes the following task: "Make two animation films. For example, use Puppet Pals or Go Animate. One movie should be an example of an everyday hero. The second movie should be an example of a superhero."

Danish as a basic subject aims to develop students' "mastery of the language" and support their development of an "open and analytical approach to the forms of contemporary and other periods and cultures" (Hansen, 2012). The purpose is that students shall develop basic literacy skills in reading, writing, listening and speaking.

Discourse of Danish as a subject	Indicators	Example
Danish as a basic subject	The focus is on strengthening students' basic text and language skills.	In the Spelling and Grammar course there are, among other things, the following learning objectives: "Spelling and grammar. You have to learn to distinguish between the word classes of nouns in definite plural and verbs in a long adjective. You must strengthen your spelling skills." The course includes activities with training in inflection of word classes, endings, etc.

A didactic design can also be analyzed based on the concept of degree of didacticization (Figure 3). The degree of didacticization refers to the extent to which a didactic design integrates didactic elements: didactic design with a high degree of didacticization contains both goals, content, methods and activities, whereas didactic design with a low degree of didacticization only points out content and activities. Thus, the process of low didacticization does not constitute an integrated didactic structure where there is a connection between goals, content, methods and activities, but constitutes a disparate structure where the various didactic elements are randomly accumulated and do not support each other in relation to creating a clear structure of the design. Furthermore, it is possible to analyze whether in designs with a high degree of didacticization the intentions for the courses are clear or unclear.
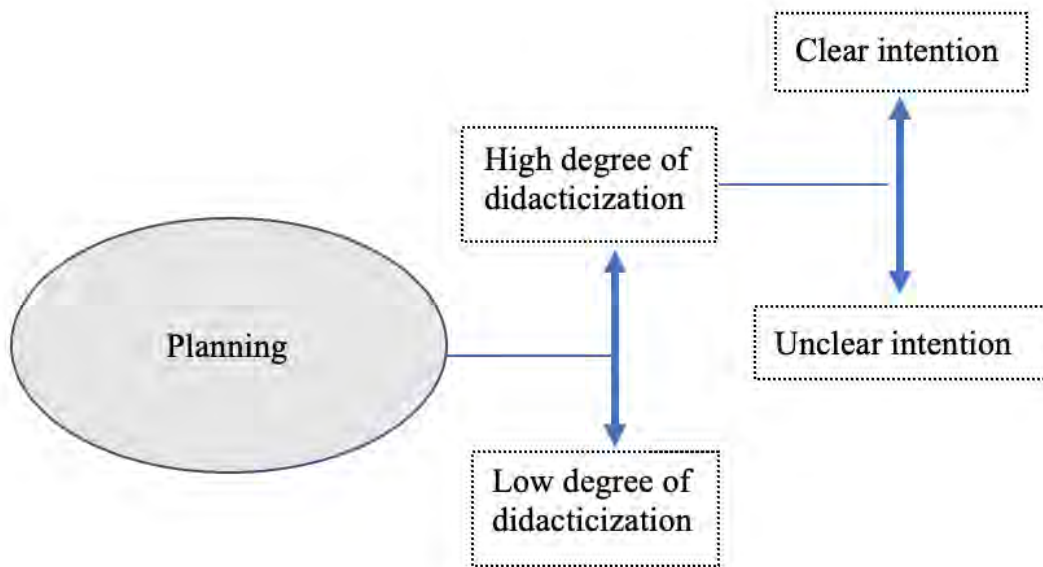
Figure 3. Relationship between the use of the platform and the structure of the didactic designs.

Analysis on discourses of Danish as s subject

In the following, we present the results of our analysis on discourses of Danish as s subject. Graf, Gissel and Slot (2018) analyzed 102 subject courses in Meebook. Our empirical data constitute 37 of these 102 courses created for Danish as a subject (Table 1). Thus, it makes good sense to see if there are patterns in the way the platform is used in relation to a particular subject when it is faced with use in a wide range of other subjects.

	Danish as a subject	Other subjects
Grades 1–3	41 %	29 %
Grades 4–6	30 %	35 %
Grades 7–9	30 %	35 %
Total number of courses	37	65

Table 1. Number of courses analyzed in Danish and other subjects as well as percentage distribution by grades.

The 37 most frequently downloaded Meebook courses for Danish as a subject have been examined in relation to whether the four subject discourses, which characterize the subject of Danish L1, emerge in each individual course. If an activity could be identified during the course, which suggests that the

students work within one of the four subject discourses, then the course gets a mark in relation to the subject discourse (Table 2).

Title of course	Grades	Danish as a basic subject	Danish as an identity subject	Danish as a creative subject	Danish as a communication subject	Degree of didactization	Academic intention
Vocal course	1-3	red				Low	
120 words	1-3	red				Low	
Frøken Ignora	1-3	red	yellow	blue		High	Unclear
H.C Andersen	1-3		yellow	blue		High	Unclear
Word classes	1-3	red				Low	
Crack the reading code	1-3	red				Low	
Fairy tales	1-3	red		blue		Medium	
H.C. Andersen 2.kl.	1-3	red	yellow	blue		High	Unclear
Heroes	1-3			blue		High	Unclear
Word classes	1-3	red				Low	
Professional reading and animals	1-3	red				Medium	
Pippi Langstrømpe	1-3	red				Medium	
First year reading - Textbook grade 2	1-3	red				Low	
Grammar in grade 2	1-3	red				Low	
Neighbouring language and Astrid Lindgren	1-3	red	yellow			High	Clear
Spelling and grammar	4-6	red				Low	
Danish, Swedish and Norwegian in grade 4-6	4-6	red	yellow			High	Unclear
Kim Fupz Aakeson	4-6	red	yellow	blue		High	Clear
Brødrene løvehjerte	4-6	red	yellow			High	Unclear

Title	Steps	Basic	Identity	Creativity	Communication	Didacticization	Intention
Lyrics	4-6	red	yellow	blue		High	Clear
Skammerens datter	4-6	red				Low	(gray)
Short novels	4-6	red				Low	(gray)
Information seeking in grade 6	4-6	red				Low	(gray)
Mørkebarnet	4-6	red				Medium	(gray)
Astrid Lindgren – a fantastic narrator	4-6	red		blue	green	High	Unclear
Danish nouns	4-6	red				Low	(gray)
Folk song – fairy tales	7-9	red		blue		High	Unclear
Comma	7-9	red				Low	(gray)
Cinematic effects	7-9	red				Medium	(gray)
Fixed advertising	7-9	red		blue	green	High	Clear
The modern breakthrough	7-9	red	yellow			High	Unclear
Romanticism	7-9	red	yellow	blue		High	Unclear
Image analysis	7-9	red				Medium	(gray)
Spelling course: Word classes in use	7-9	red				High	Clear
Written presentation in grade 8	7-9	red		blue	green	High	Clear
Papers	7-9	red			green	High	Clear
En - to - tre – nu	7-9	red	yellow	blue		High	Unclear
Sum	37	35	11	13	4		

Table 2. The table shows respectively the title, steps and whether there are activities in each course that can be characterized as, respectively, Danish as a basic-, an identity-, a creativity- and communication subject. In addition, the table shows the degree of didacticization and whether a clear academic intention can be identified in the highly didacticized courses. Steps are divided into respectively grades 1–3, 4–6 and 7–9.

The analysis of discourses shows:

- 19 of the 37 courses have a purely Danish as a basic subject focus.

- Only two courses do not include a Danish as a basic subject approach. In other words, Danish as a basic subject is represented in 35 of the 37 courses.

- In a course that combines Danish as a basic subject with other subject discourses, a combination is often seen with Danish as an identity subject and in some cases Danish as a creative subject assignment of some kind.

- Danish as a communication subject is only in play in 4 of the 37 courses; it is the courses of respectively advertisements, written production, newspapers and book reviews in a literature course. In all four courses, this is done in combination with Danish as a basic subject.

The creative dimension of the courses usually has less weight than Danish as a basic and identity subject. For example, in the course "En-to-tre-nu" there is a cycle where the students for each bite the teacher has divided the book into, make a summary (Danish as a basic subject), answer a number of mostly closed questions (Danish as a basic subject), choose a section that made a special impression on them, and justify their choice (Danish as an identity subject). This is what the students do a total of six times. After this, the students must create a personal gallery in writing, delve into the novel's parallel discourse, consider the meaning of headings and the ending as well as the theme, and assess the novel and its perspectives for other texts (combination of Danish as a basic subject and Danish as an identity subject). At the end of the course there is a creative task.

A study of the form of the didactic designs shows that half of the courses have a low to medium degree of didacticization and the other half have a higher degree of didacticization. The lower degree of didacticization consists of simple activities, for example a course (Vocal Course) or read-and-understand activities related to a literary course (e.g. the course Pippi Langstrømpe), where students must read or hear the book read aloud, answer questions and fill in word cards. The courses with a higher degree of didacticization can be divided into one half with clear academic intention and one half with unclear academic intention. An example of a course with an unclear academic intention is the H.C. Andersen course, where students have to read a short biography of Andersen, watch a video about his life, read his fairy tale *Fyrtøjet*, answer three questions on the text, select a scene and draw it and watch a film version of *Fyrtøjet*. There is no clear didactic integration and intention in the process which consists of activities under an umbrella called "H.C. Andersen". Another course has a clearer academic intention, the aim of which is knowledge of the lyric genre. Students are introduced to the lyric genre and themes such as rhyme types, they meet various poems and end the course by writing poems themselves. The structure

of genre learning based on the teaching-learning-cycle model can be seen as the underlying structure of the process.

If we compare the degree of didacticization and the discourses of Danish as a subject, it is striking that the 13 courses that have a low degree of didacticization also represent Danish as a basic subject. The remaining five courses which also represent Danish as a basis subject have a medium degree of didacticization. Thus, there is a clear tendency that a narrow focus on Danish as a basic subject is associated with a low degree of didacticization and thus also an unclear academic intention.

Conclusion

Our didactic analysis of the teachers' production of didactic designs shows that half of the teachers' courses are based on Danish as a basic subject. This version of the Danish subject represents only a part of the Danish subject and does not, for example, include students' experience of literature as sources of development of personal and cultural identity, their personal and well-balanced use of language or their open and analytical approach to the forms of expression of culture. Instead, it is these elements that provide the subject with existential and cultural interest and motivation. Seen from the Danish as a basic subject position, Danish as a subject becomes something you train and that helps to develop basic skills and knowledge of texts and languages. The question is whether this version of Danish as a subject is related to the fact that learning platforms have a strong affordance for supporting the design of Danish as a basic subject, which works with a narrow form of knowledge that can be organized and trained. Or whether the Danish as a subject discourse has a dominant role in relation to the other discourses: Danish as an identity subject, a creativity- or communication subject. We cannot answer these questions on the basis of our analysis. Hence, we suggest that the following aspects need further research:

- How do teachers perceive the affordances of the learning platforms?
- To what extent does teacher planning in the learning platforms differ from their usual practice?
- How would teachers design courses if they were more familiar with the functions and affordances of the platform?

We began this article by quoting Ellen Krogh's view that when a subject is brought into new contexts it must be discussed and legitimized again. We hope that working with a learning platform can help to qualify this task, but we are currently skeptical that the learning platform as a didactic context in itself can help develop new didactic designs and innovative teaching. Furthermore, we are also skeptical that the learning platform, in its current form, can support teachers' development of didactic designs with a high degree of didactization. The Danish academic practice reflected in the 37 courses are examples of

interesting experiments in developing the Danish subject in a new practice context, but in our opinion are not yet examples that can be used to guide teachers into this practice. To this end, it would seem that the teacher's familiarity with the learning platform and its didactic capabilities are still limited.

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Knowing or doing history?

Teachers' staging and use of teaching resources in the school subject of history

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Introduction

This article presents an ongoing research project focussed on the use of teaching materials in the school subject of history. Among other issues, the results from the completed pilot phase seem to indicate that the focus in the lessons is on the students' acquisition of factual or "first-order" knowledge and mostly ignores the concepts and procedures involved in the construction of narratives about the past; in short, the balance between "knowing" (acquisition of substantive knowledge) and "doing" (identifying or asking questions about the past, using sources etc) history, as the curriculum prescribes, does not exist (e.g. Havekes, 2015, pp. 33-39). After a discussion of a case from the pilot phase, the article presents preliminary considerations about the next phase of the project, which will focus on the responsibility of teaching materials for the understanding and use of historical knowledge.

Historical knowledge

In 1814, Denmark implemented a seven-year public school system for both boys and girls. Religion (evangelical Lutheran) was the most important subject to be taught during most weekly teaching lessons. The students were also taught pieces of "fatherland" history, with the emphasis on kings and important and great people (all men) from Danish history. History was not a subject as such, but its teaching was integrated into the subject of Danish during mother-tongue education (Pietras & Poulsen, 2011, pp. 49-50).

As in several other European countries, various nation-building processes gained strength during the last decades of the 19th century (Berger, 2010). Although history still was not taught as an independent subject in public schools, narratives about Denmark's glorious past were widely considered to be a vital means to strengthen students' experience of belonging to a national community and to convince them that the national community was more important than other types of communities. Publishing houses put forth several history textbooks for educational purposes; typically, these books had a limited number of pages (100–150) and covered all the knowledge students were expected to acquire while attending school.

The structure of the books largely had the same concept. The books started with legends and myths about the Norse gods and early legendary kings before moving on to somewhat more modern topics. The books were arranged chronologically, from the Viking Age onwards (typically according to kingship), and the teaching content consisted of the transmission of a body of narratives about the great past of the Danish nation, where usually wise and disinterested kings helped the country and the people through adversity and enemy attacks, often by the Germans. The teachers' oral narratives supported the nation-glorifying reports found in the textbooks (Nielsen, 2010, pp. 29-30).

While history is fundamentally a matter of interpretations of human societal life within a perspective of change and continuity (e.g. Jordanova, 2000, p. 1; Chapman, 2011, p. 172), this was not the case in the school subject of history. Neither in the textbooks nor in the teachers' oral storytelling did narratives about the past appear as interpretations. Knowledge about the past was typically mediated as a series of "closed" stories that appeared as an absolute and indisputable truth about people and events in the past. The students' perception was that what they read in their history textbooks and the stories the teachers told them were an exact copy of the past; what they had read was not in question and could not be viewed from other points of view.The students did not learn anything about how or why they could know anything about the past or the basis for these narratives about the past; today we refer to this type of knowledge as background knowledge or second-hand and procedural knowledge.

The students' task during history lessons was to learn the historical narratives more or less by heart so that they could then retell them. In 1900, history became an independent subject. The curriculum, known as the "circular of Sthyr", starting that year, stated the following aims and guidelines for teaching history, among other things: assisting in "a healthy and powerful imagination in conjunction with a warm and vibrant feeling, especially for our people and country, is the task of history teaching… Through transparent and lively storytelling, the historical persons and events should be put to the attention of the children' (Kirke- og Undervisningsministeriet, 1900). Besides teaching students love for the Danish people and the nation state, teaching and the use of history promoted a perception that history was about the accumulation of factual knowledge.

Change and continuity in history teaching

Although the aim of school subjects is now completely different, and the national glorification of Denmark, kings, and great Danish men (and a few women) has been abolished, what happens in practice when the focus moves to the use of teaching resources in the classroom has become the next question. Do the ways in which teaching resources are used in the classroom predominantly facilitate a

conception of transmission of what appears to be factual knowledge about the past, or do they promote "doing history", with an emphasis on students' reflection and knowledge building?

This question is among the general questions to be asked in an ongoing history research project that is part of a larger research project called *Praksisforskning af Læremidler'* or PaL (Researching the Use of Teaching Resources), launched by the Danish National Centre of Excellence for Teaching Resources. The PaL history project started in the spring of 2019 with a pilot phase that lasted until the autumn. Our focus was to obtain a picture of how teaching resources were used in history lessons as well as their significance for the teachers' teaching and the students' learning. The hope is that analyses and interpretations from the pilot phase should lead to identifying issues for further investigation, which will be implemented in the spring of 2020.

We prepared a review (limited to English and the various Nordic languages) that focussed on research publications on the issue. We found several articles that focussed on the analysis of history textbooks and showed the results of history book analyses, but nothing about the use of teaching materials in practice. For this reason we chose a methodical approach in the pilot phase that may best be characterised as grounded and anthropological. During the pilot phase, we also tested appropriate methodical approaches. For instance, we completed classroom observations based on a matrix from Uwe Flicks's *An Introduction to Qualitative Research* (Flick, 2009), video-recorded teachers' and students' use of different teaching resources, and conducted semi-structured interviews with teachers and groups of students.

A subproject about historical knowledge

We analysed the collected date during the autumn 2019. Based on the results, we decided to identify three or perhaps four sub-projects. The focus of one of these, presented in this article, is on the understanding and use of historical knowledge that various types of teaching resources bring into the classroom.

The remainder of this paper is organised as follows. I will first discuss concepts of historical knowledge in the school context before using various points from classroom observations and interviews with teachers and students to point out some of the challenges I observed related to teachers' and students' understanding and use of historical knowledge in light of the intentions and aims of the curriculum for history. I will then present several central preliminary considerations for a study design aimed at a more specific analysis of how teaching materials can convey and provide understanding and use of historical knowledge in the classroom.

Historical knowledge and the curriculum

Earlier, I mentioned the circular of Sthyr. At the time, there was barely a connection between history as a school subject and as a science subject, neither in the teaching itself nor in the teaching materials. At least since 1960, changing curricula have emphasised the connection between science and school subjects. For many years, an educationally adapted selection of results (but not methods) constituted knowledge of the school subject.

The current curriculum, implemented in 2015, defines history as a competence-oriented and inquiry-based subject where students actively construct and use historical knowledge (Børne- og Undervisningsministeriet, 2019). Among other things, the curriculum implies that students must apply customised historical methods and thus make a closer connection to science subject history. This situation does not mean that the content (understood as knowledge, skills, and competencies in the school subject) is a simple reduction of history as a science subject. The content must be transformed to "fit the educational purpose of teaching" (Dericke et al., 2018, p. 429) and implies considerations concerning why, what, and how to teach history in public school.

The purpose of teaching (which includes answers to various didactic questions) is stated in the history curriculum. The overall aim highlights that the students must be able to use what they learn in subject history to gain a deeper and better understanding of their society, in particular by gaining the necessary knowledge and skills to become orientated towards a democratic society and to be qualified to relate to, take a position in, and act competently in that society. For the "how" question, the overall aim states that "students must work to analyse, interpret, and evaluate historical contexts and issues" (Børne- og Undervisningsministeriet, 2019, p. 7). History is thus a problem-orientated subject, meaning teaching is based on students' curiosity and wonder about an event in the past, and therefore teaching must be organised to support inquiry-based learning.

The overall purpose of the subject is specified within areas of competence (including chronology, context, coursework, and the use of history) as well as competence goals that must be achieved at certain class grades (Undervisningsministeriet, 2019, pp. 10-15).

In Denmark, history is a school subject from third to ninth grade. To live up to the intentions of the curriculum, teachers from the beginning must strengthen their students' understanding that knowledge in history has a different character than it does in several other school subjects. The students must learn that the prime domain of the subject – the past – does not have an independent existence. The past must be staged as historical narratives based on interpretations of relics and sources from the past as well as contemporary constructions of the past (Chapman, 2011). From the beginning, it is thus important to organise teaching that develops students' competencies to think and reflect historically. I will not explain

the variations in understandings and definitions of historical thinking/reflections (e.g. Seixas, 2013; Lee, 2005; Boxtel, 2007). Andreas Körber, a German researcher on the didactics of history, has discussed in several articles the close connections between historical thinking and historical competences (Körber & Meyer-Hamme, 2015). Whether directly or indirectly, these concepts of historical thinking or aspects of historical reflections are embedded in the Danish history curriculum. The educational consequence is that teaching must be organised in order to develop students' competencies to address traces from and narratives about the past. The Canadian professors of education and pedagogy Stépane Lévesque and Penney Clark (2018, pp. 120-121) have explained five interrelated historical competencies (including knowledge, skills, and abilities) to assess, which several scholars of the didactics of history (e.g. Körber, 2015; Kölb & Konrad, 2015; Rüsen, 2005) have discussed, as follows.

Historical inquiring competences refer to the heuristic ability to formulate and identify questions that are historically relevant and are useful for students' further investigation processes.

Historical methodical competences refer to the ability to search, find, analyse, and interpret historical sources that are relevant to answer the selected historical questions; on a more advanced level, such competences also include the ability to deconstruct existing historical narratives.

Orientation competences refer to the ability to use the knowledge gained from an investigation to reflect on earlier conceptions about the historical issue and to formulate perspectives on contemporary issues, i.e. to use the knowledge to develop historical consciousness.

Narrative competences refer to the ability to make connections and to create a "synthesis of the dimensions of time with those of values, judgements, and life experiences" (Lévesque & Clark, 2018, p. 125). While Körber (2015) discusses the three above-mentioned competences, Jörn Rüsen (2005, pp. 21-25) considers the narrative competence to be superior to the other competences. In any event, students must experience and understand connections between their own lives and the school subject.

Subject matter competences, which are relevant to the various competences noted above, refer to the recognition of the imperative to use and reflect on history, and "even to reflect the very premises of historical thinking itself" (Kölb & Konrad, 2015, p. 25).

Historical knowledge in the classroom

What happens in practice? Do the teaching materials and the teaching itself strengthen the students' historical competences and abilities to think historically? If we ask the students, then a widespread perception of the school subject may be described in this way: the more factual knowledge about the past that people have acquired and that they can reproduce, the better and more skilled they will be in the subject. Many students assign a low rank to the utility of history compared to other school subjects

(Knudsen & Poulsen, 2016). Their conception of the subject is thus a narrowed and simplistic version of what Lévesque and other scholars of the didactics of history refer to as substantive knowledge (Lévesque, 2008, p. 29; VanSledright, 2011). The Canadian cognitive and educational psychologist Carl Bereiter (2002, p. 325) characterises teaching that focusses on "names, dates, definitions" as pedantic. Among history teachers, one may also find that the most important factor in the subject is that students should know those facts that are widely considered to be historically important (Knudsen & Poulsen, 2016).

What appears to play a minor role (and in some cases seems to be completely absent) in both history teaching and teaching resources is procedural or background knowledge and concepts (VanSledright, 2011; Lévesque, 2008, p. 37). In other words, the conceptual tools and methods that are used for studying the past, analysing and interpreting sources, and creating meaningful and substantiated narratives are tools that are necessary for the study of the past and for the construction of the content of historical knowledge.

In history teaching and in the teaching resources themselves, historical content can be presented only as first-order (or content) knowledge "that includes knowledge of historical events (e.g., fall of the Berlin Wall), structures (e.g. feudal system), themes (tension between the State and the Church), concepts (e.g. modern imperialism) and chronology" (Boxtel, 2018, p. 155); such content also serves as a way of organising the teaching, for which Denmark has a strong tradition. The possession of at least some content knowledge is still necessary, or else students will be unable to understand and apply procedural knowledge. Finding the right balance between "knowing" and "doing" history appears to be a challenge, however.

A case from the pilot phase

A case from seventh-grade history lessons that we followed during the pilot phase may be used to illustrate some of the challenges involved in finding a balance between knowing history and doing history in practice. At the discretion of the students, the topic was about events and people from US history. The teacher had prepared a list with possible topics that the students could choose from. The students were to work in pairs. The teaching was organised to be problem-orientated. After choosing an event or person, the students had to formulate questions about the historical event or person they wished to seek answers to. The teacher found several sources related to the chosen topics. The students were able to find other information and courses relevant for answering the questions at the school library or on the internet. Every student in the class had their own laptop with internet assets. Before

the students started their study work, the teacher urged them to be critical when they searched for information and discussed several elementary approaches to analysing and interpreting sources.

The results of the students' work were presented as a digital book consisting of texts, pictures, audio, and video produced with the 'Book Creator' tool. The digital books and the students' presentations also had to contain information about the process, including their critical considerations of their choice of sources and how they analysed these sources. The teacher told us about the workflow. We did not observe this part of the teaching, only the students' presentations of the digital book. The following is based on our video recordings and field notes.

The presentation of the products was done according to the same pattern. First, the students said a few words to introduce their topic. In this case, the pair of students presented a digital book about John F. Kennedy. As an initial question, the teacher asked the class what they knew about Kennedy. The students all apparently knew that he was president of the United States and that he was killed by a gunshot wound to the head; they had gained their knowledge from videos and films. As noted, the teacher's question was aimed at gaining factual answers. The question did not lead to historical reflections: for instance, why the teacher had put Kennedy's name on the list. The digital book was then shown on a smartboard. As in most of the other presentations, the questions and problems were aimed at first-order knowledge, in this case about Kennedy:

- Who was John F. Kennedy?
- How did he die?
- What did people think about him?
- How was he as president?
- What are some of the different theories about his assassination?

The answers to the first two questions were factual; the rest had no correct answers. The questions could lead the way to historical reflections, for instance about evidence, continuity, and change and historical empathy. As with the first questions, however, the students asked the last questions as if they were indisputable facts.

The two students mostly read aloud from the digital book; they also occasionally strayed from the text and elaborated on something from the presentation. The teacher provided the students with some sources, but they did not use them much. It was clear from the digital book that a part of the students' text had simply been copied and pasted from the internet. The students did not talk about their considerations of the usability of the sources they had found online. To get the students to reflect on the sources they had chosen, the teacher asked them if a diary would be a good source. The students' answers were hesitant and evasive.

At the end of the presentation, the other students (in groups) had to produce an A3-size poster with at least three things they had learned about Kennedy; the poster also had to include at least one illustration. The group put the following statements on one of the posters: 'His wife's name was Jacqueline', 'His name was John Fitzgerald Kennedy', 'He had three children', 'He was the president of the US', and 'He was president for 1,037 days'.

The teacher (as with the other teachers involved in the pilot phase) was a skilled and committed teacher who could organise a varied education with the use of numerous activities and different teaching materials. His students, however, still more or less had basic views of history. They felt that history was about having factual knowledge and that "correct" answers to historical questions do exist.

The next step

Despite changing curricula over the last decade or two in Denmark, history has typically been defined as an analytical and interpretative subject where students are supposed to work with an emphasis on their investigative work and doing history. In practice, however, knowing history and learning what people mistakenly perceive to be facts and truth about the past appear to be most important in teaching. While multiple and related factors could explain why Bereiter's (2002) expression of pedantry in the teaching of names, dates, and indisputable causal relationships is still common in teaching, two reasons are the most obvious: the teaching materials and how the teachers themselves orchestrate the use of the materials.

As mentioned earlier, the digital didactic teaching materials produced by publishing houses are becoming more widespread. During the continuation of the project in the spring of 2020, we will analyse in depth how historical knowledge is generally perceived and used in one or two of these teaching materials. Still with a focus on the conceptions and use of historical knowledge, we will try to determine how the digital teaching materials are used in practice. The design of the research is not complete and will be developed in collaboration with the other researchers in the history group, but a few preliminary and unfinished elements may be mentioned, as follows. First, we will examine the mediation of historical knowledge found in the teaching materials by asking several questions:

- What is the general perception of the students found in teaching material: Are they 'producents' or 'users' (Levstik, 2015) of historical knowledge?
- What does the teaching material say about historical knowledge and how knowledge of the past comes into being?
- How does the teaching material allow for students' historical thinking and reflections?

- What tools and methods do the teaching materials offer so that students will experience that the subject is about doing history?

We will also examine the transformation of content from history as a science subject (Gericke, Hudson, Oline-Cheller, & Stolar, 2018). For example, how and why does this transformation happen? Finally, we will examine the teachers' staging and use of the teaching materials:

- How does the teacher facilitate students to reflect historically while working with the teaching material, including change and continuity, causes and consequences, and evidence?

- How does the teacher demonstrate elements of historical and reasoning? Are the demonstrations implicit or explicit?

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Literacy coaches and the dilemmas in supporting teachers' use of learning materials

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Abstract

Research shows that literacy coaches can improve the professional development of in-service teachers (Gibbons & Cobb, 2017; Woulfin & Rigby, 2017), but in this process they also often face different dilemmas in their coaching practice. For example, in the form of different kinds of collegial resistance to what they do (Jacobs et al., 2017). Not much research has focused on how literacy coaches make sense of their support of teachers' selection and use of learning materials e.g textbooks in different school subjects. Therefore, the aim of this article is to analyse what kind of dilemmas literacy coaches experience in their professional support of their colleagues' selection and use of learning materials. We will answer this question from the perspective of sensemaking theory (Weick, 1995; Coburn & Woulfin, 2012). The article's findings are based on a qualitative field study that began in January 2019 and consists of observations and interviews of literacy coaches in three Danish public schools looking at how these coaches make sense of especially using assessment data in supporting colleagues in their instructional decision-making. The findings in this project show that it is difficult to find time to coach and support teacher in selection and use of learning materials. Often the literacy coach does not have the possibility to follow up in which way the teacher implements the ideas and suggestions that she suggests and evaluate how the pupils benefit from that. Another dilemma has to do with the selection and use of learning materials in relation with test results. Learning materials that addresses specific spelling or reading problems are suggested by the literacy coach. This means that the teacher does not necessarily change the "permanent" learning materials. In some situations, the literacy coaches are also entering a political role suggesting learning materials that the municipality has decided that the schools must use. Time also influences the possibility for the literacy coach to follow up.

Keywords

Literacy coaching; selection and use of learning materials; data use; assessment data and tests; sensemaking

Introduction

Almost every public school in Denmark has a literacy coach. She is a colleague who is educated to work as a professional literacy coach in a school together with teachers and school management. The Executive Order on Education for Literacy Coaches in the Primary School (hereafter, the Executive Order) states that the purpose is to qualify literacy coaches, so they are capable of coaching colleagues regarding reading and writing in Danish (L1) and in the school's other subjects in all grades. Specifically, the literacy coach must qualify to guide teachers on content, methods and material selection (choice of teaching materials and textbooks) in reading and writing. In addition, they need to interpret and disseminate test results to several actors, namely school management, teachers / colleagues and parents[41]. Literacy coaches must also be able to assess students' individual reading needs: the Executive Order emphasizes that the literacy coach can assess learning materials and different kinds of teaching methods "including textbook materials and IT-based materials".

A literacy coach is a special kind of instructional coach. Literacy coaches are defined in different ways in the international literature (Knight, 2011; Kurz et al. 2017). Generally, they are described as being of great importance at different organizational levels in their function as "professional sensemakers" (Domina et al., 2015). They help both school management and administrators at the municipality level in translating academic content into classroom practice. This is also the case in Denmark. Galey (2016) stresses that literacy coaches help districts coordinate textbook adoption, develop curricula and provide professional development, but they also play a role in mentoring new teachers. Coaches also play an important role when it comes to student learning (Teemant, Wink & Tyra, 2011). However, the role as a literacy coach can be difficult and multi-faceted (Sisson & Sisson, 2017) and several dilemmas appear when investigating their practice. In the following, we will unfold some of these dilemmas from a sensemaking perspective.

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[41] In practice, we also see how the literacy coach interacts with the coordinator of the literacy coaches in the municipality.

Sensemaking as a theoretical framework

Organizing, and the analysis of organizing, involves patterns of action performed by individual actors. The organizational theorist Karl Weick calls this "the double interact" (Bauer, 2019: 120). Different kinds of actors, in this research project literacy coaches and teachers, and their actions are investigated. The literacy coaches have certain patterns of action and the ways they act are contingent on the actions of the teachers and school leaders as well. Weick argues that it is important to work with verbs instead of nouns, which is why he uses the word "organizing" instead of "organization". He does so because it emphasizes the processes and actions by speaking of organizing as a consensually validated grammar for reducing equivocality. "To organize is to assemble ongoing interdependent actions into sensible sequences that generate sensible outcomes" (Bauer 2019: 122). Organizing involves three stages: 1) enactment, 2) selection and 3) retention. *Action* is the genesis of enactment and the literacy coaches (actors) play an active role in the sensemaking process because he or she selects and notices certain things in the school, the instruction, the assessment data or the choice of learning materials where action is required. The selection and the retention are viewed as contingent on e.g. teachers' (actors') interpretations of these actions and the meaning they ascribe to them. *Selection* is retrospective sensemaking because literacy coaches and teachers are only able to interpret actions they have already carried out, in order to make new and maybe different selections in the future. Test results can say something but not everything about what has already been done, e.g. how the teacher has taught spelling or reading. *Retention* can be understood as a way actions are remembered by the actors collectively, which sometimes results in new routines or establishing new rules or norms if possible. The sensemaking process is defined as the process actors use to reduce equivocality, where the interlocked behaviours are developed and the shared goals are discovered (Bauer, 2019: 124; Weick, 1995). This happens during reading conferences, where shared goals are formulated and decided. Actors can shape each other's sensemaking process and, as Coburn (2001; 2005) argues, in an educational context literacy coaches also shape teachers' sensemaking and decision-making and are therefore of great importance in the school.

Method

The research project's findings come from an ongoing case study (Flyvbjerg, 1988), which started in January 2019. Four literacy coaches at three different Danish primary schools in two different municipalities were interviewed and observed (29 hours) (Czarniawska, 2008; McDonald, 2005; Brinkmann & Kvale, 2014) in the different organizational routines of the schools. Using *shadowing* as an observation method makes it possible to investigate organizational processes involving bot the literacy coach, other actors and test in school (McDonald & Simpson, 2014; Johnsson, 2014). The purpose of

the study is to contribute new knowledge on how literacy coaches make sense of various forms of testing when they work alone, as well as together with teachers/colleagues and school management, looking at how these coaches make sense of especially assessment data in supporting colleagues in their literacy decision-making. The data from the research project have been coded openly, using a constructionist grounded theory perspective. Different kinds of patterns were grouped (concepts), and some of these concepts are analysed in this article (Charmaz, 2014).

The research question of the study is: How do literacy coaches make sense of the dilemmas they are confronted with in their support of their colleagues' use of learning materials?

Findings

Dilemmas in literacy coaching and use of learning materials

The findings of this ongoing case study can be seen as different kinds of dilemmas. Some of the dilemmas are similar with empirical findings from previous research conducted in 2015-2018 by Albrechtsen (2018) where instructional coaches were investigated. Some of the dilemmas that this project found were: a) that coaches experienced a lack of time coaching colleagues, b) that it was important to be visible in the everyday life of the school, c) that it could be a problem to find the right legitimacy for being a coach, and, finally, d) coaches experiencing a lack of professional depth in their coaching. Not surprisingly aspects of the same four dilemmas can be seen in this project, though two new dilemmas have emerged in the data, and these are dilemmas concerning literacy coaches' *knowledge on learning materials* and *the interdependency regarding tests and learning materials.*

In the following section, we will analyse two dilemmas: 1) time, learning materials and coaching, and 2) knowledge and use of learning materials. Time has a great influence when it comes to supporting teachers' use of learning materials, because the municipality and the school leader decides how to prioritize time. Knowledge of learning materials and the literacy coaches' pedagogical content knowledge of spelling and reading play an important role when supporting teachers use of learning materials.

Dilemma #1: Time, learning materials and coaching

When literacy coaches talk about how it was before and how it is now, they experience another order of priority when they compare their assignments and ways of prioritizing their time. Now, there are many "must do" assignments, decided by the municipality. The literacy coaches enact new policies on, for example, dyslexic pupils in schools, which changes the assignments. By focusing on dyslexic pupils or

implementing the new national dyslexic test means that time must be prioritized in new ways and some assignments must be downgraded, one of the coach's states. When looking at the literacy coaches' assignments, much time is spent on testing (distributing, taking, collecting, analyzing the tests, and communicating results to parents, colleagues and the municipality) and less time is spent on actual coaching, according to the literacy coaches. When the tests have been taken, there are different ways of following up. Follow-up routines after coaching activities take place by e-mail and during coffee breaks or in the hallways. A more formalized way of following up is reading conferences. A reading conference is a yearly meeting between the school leader, the literacy coach and a Danish teacher and can be understood as a kind of coaching. They meet to talk about each class' reading and spelling results and how each student is developing, using test results. Sometimes, other kinds of formative data like written work from teaching situations are also part of this meeting. Reading conferences are an organizational routine that was established in order to evaluate all school classes' test results (EVA, 2009). Preparing for these reading conferences, the literacy coach reports that she used to spend time finding different kinds of learning materials that addressed specific problems in reading or spelling, according to test results; the literacy coach would give the colleagues the materials personally, and the teachers found them meaningful and useful. When talking to the literacy coaches about their coaching role or their advisory role regarding learning materials, one of the literacy coaches reflected as follows:

> Well they [the learning materials] play a role as well. Recently I have not had time to look at it [materials]. But previously when I had reading conferences or when I talked to colleagues I have always had something, where I thought, I will just find it [materials] because it can be good to give, they like to get something in their hands, right? But now I have moved away from that because I do not have the time, my time has been cut down.

This is a typical statement from the interviewed coaches in this study. In this way, the suggested learning material is "solving" a specific problem of spelling or reading in the teachers' class. At the same time, it can save the teacher some time finding materials that address this problem, and the literacy coach's specific knowledge of spelling and writing guides the teacher's choice of learning material. However, the time to find learning materials has been reduced, which can be explained in the change regarding the literacy coaches' (new) assignments, influenced by the political level. This way of using learning materials in coaching situations and in relation to test results is seen in all three case schools.

Reading conferences are one of the different kinds of coaching activities in schools. But there are also quite different expectations to coaching. The teachers often seek quick fixes instead of going into time-consuming reflective dialogues. This is due both to limited time allocated for the literacy coach and their focus on other assignments, but also because this is what teachers want. Participating in coaching activities needs to be perceived as "time well spent" from the teachers' point of view. When the school leader has allocated time for coaching (e.g. one hour per teacher each school year), most teachers do not want to be a part of it, as a literacy coach tells us. The expectations for coaching differ whether you are a coach or a teacher. The literacy coaches prefer deep coaching, e.g. modelling "how to" and scaffolding in the classrooms or observing. On the other hand, it can be uncomfortable when a literacy coach is going to observe or visit their classroom. It also takes a lot of time. The literacy coaches know that teachers lack time to prepare their teaching. This might be one of the reasons why the literacy coach suggests learning materials. Looking at coaching from the teachers' point of view the expectations differ; they mostly want quick fixes. Time is a recurring and continuous theme in the data, both regarding looking at and analyzing new learning materials, and in terms of time for coaching colleagues. Another dilemma concerns the knowledge and use of learning materials.

Dilemma #2: Knowledge and use of learning materials

The second dilemma is about the literacy coach's knowledge of learning materials. This dilemma is interesting because the Executive Order says that coaches must be able to guide teachers on content and methods and the selection of reading and writing materials. For teachers, it makes sense that they get recommendations on learning materials, but literacy coaches do not have time for that anymore. We also see that bad test results lead to a specific course, e.g. in spelling or reading strategies and the selection of specific learning materials such as VAKS or Tryllestaven.

It can be difficult to "get rid of" learning materials in schools, as a literacy coach tells us. Even though the literacy coach knows how grammar should be taught, due to her pedagogical content knowledge, she is not capable of getting rid of learning materials that do not oblige that. The literacy coaches have great knowledge of, for example, spelling development, and at a team meeting they discuss how to teach morphology as part of spelling. Literacy coaches are well aware of how important it is to help teachers to understand how to address specific ways of teaching according to spelling problems, because the learning materials do not make them aware of the development of spelling. The learning materials suggest content and areas to teach and not how and when to teach which areas according to pupils' spelling development. A lot of teachers address the spelling problem training the specific spelling problem and

some of them are unaware that the pupils need to be taught at another spelling level than the test results points out to be a problem. This has to do with knowledge of spelling development (Gjelstrup et al. 2014). The literacy coach can select and evaluate a learning material and assess how it works, using their knowledge of spelling development and for example morphology. However, knowledge of learning materials cannot stand alone according to one of the literacy coaches. She thinks the teachers would benefit more from modelling and being shown "how to do it".

Some test materials suggest new strategies on, for example, reading or spelling. It can be difficult for the teacher to know exactly how to improve his or her teaching and to know which learning materials that work with different kinds of reading or spelling strategies. The learning materials need to be assessed or evaluated and that can take quite a lot of time. However, the literacy coaches do not always have time to evaluate which learning material works with which strategy, neither has the teacher. Some of the diagnostic tests in reading and spelling have a teachers' guide, and in these teachers' guides there can be some (not always updated) suggestions for learning materials. We see that the literacy coach uses the teachers' guide to the reading test because it "translates" test results by suggesting which areas to teach, such as consonant combinations or the 120 most frequent words. But it can be difficult to find out which learning material works with the suggested strategy or way of teaching.

Another way the literacy coach is engaged with learning materials is when the municipality decides to buy learning materials, in this case the digital reading platform BookBites. This means that literacy coaches must help implement new learning materials and indirectly persuade teachers to use them. In practice, the literacy coach mentions the learning materials during reading conferences, for example, and suggests the materials in relation to test results. In this way, literacy coaches enact policy and thereby play a political role, shaping teachers' sensemaking by showing and describing how certain learning materials address a specific reading problem, such as when pupils' reading is too slow.

Literacy coaches have pedagogical content knowledge which is important when choosing and using learning materials in relation to test results.

Discussion

Literacy coaches experience different kinds of dilemmas when they work as "professional sensemakers" in school. Time plays an important role. The municipality, the school leader, the literacy coach herself and the teacher all have different opinions on what makes sense. When it comes to coaching, the literacy

coach prefers deep coaching, which can help teachers reflect on their teaching and that might result from changes in their way of teaching. The teachers usually prefer quick fixes. There are two interesting findings in our research. One has to do with time in relation to coaching, which addresses a structural dilemma; this challenges the routines and ways of organizing coaching in school. The other finding has to do with the selection and use of learning materials in relation to test results, which addresses a political problem.

The three case schools have almost the same kind of routine when it comes to testing and follow-up routines. Prioritizing the time in reading conferences is a annual, recurring routine for schools. However, the purpose of the conferences and this way of coaching is unclear. Every student's test results are a part of this conference, which means there is very little time to investigate how the teacher can address each student's problems. There is not enough time for deep coaching. When learning materials or new ways of teaching are suggested, for example in the reading conference, it is uncertain how the teacher should implement the ideas and suggestions in her teaching and how the pupils will benefit. In order to change teachers' way of teaching they need to be scaffolded; the literacy coach needs to show them "how to", according to the coaches. However, the literacy coaches do not have time to do that. It is important to discuss how the literacy coach spend her time and to find out if the school has meaningful routines that help the teacher adjust her teaching to the students' need according to test results. We do not know how the students benefit from the decisions unless the literacy coach has the possibility of following up and evaluating suggestions arising from coaching situations.

Learning materials play an important role in coaching situations because they help teachers, who do not always think they have enough time to prepare teaching. Some specific learning materials, such as VAKS or Tryllestaven, are suggested by the literacy coach to address a specific problem. This means the teacher does not necessarily change the "permanent" learning materials. The teacher may be introduced to new ways of teaching spelling by the literacy coach, but it is unclear how she should make these changes in relation to the existing learning material. Another problem is that the literacy coach seldom has time to follow up how her suggestions, for example of learning materials or teaching strategies, are implemented by the teachers. This is due to lack of time and ways of prioritizing time. A last reflection, based on our preliminary findings in this case study, is that literacy coaches are entering a political role, suggesting learning materials that the municipality has decided the schools must use. What if the literacy coach would rather suggest other learning materials, which address pupils' problems according to the test results? What

if the teachers are not willing to use those materials? Such questions will be of interest in future study of the literacy coach's role in supporting teachers' selection and use of learning materials.

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Printed material and digital media in teaching History: presence and frequency of use in the classroom

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Introduction

A research line focused on the teaching-learning processes of the History of Spain in the Autonomous Community of the Region of Murcia (CARM) has been developed for almost 30 years. The questions generated in this period, have built the working plan. This article discusses the use of the textbook, the digital media and teacher's notes-materials in the classes of History of Spain. The study of these media offers a perspective centre on the 2015-2016 course, about their presence (if / not used in the classroom) and frequency (assessment from 0 to 4, showing the intensity of daily use) in the classroom. The use of the textbook, together with the increase of the teacher's notes-materials and the ICT, poses a challenge to know and some questions to answer. So, the main question is What means are being used in the classrooms of History of Spain in the CARM? It leads us to break it into: What presence and frequency do these media have in the classrooms of History of Spain in the 2014-2016 courses at CARM?, How does the student describe this use? and How do these media relate to each other?

Theoretical background

A very short summary about previous research of this topic will involve Pingel (2010), the author introduces a general review about the research carried out on the textbook, highlighting different theories from various authors, specialized journals, published works and the research contexts in this field. Hansen's study (2018) summarizes the studies related to "Textbook Use", emphasizing the need to know "*the modifications performed by the teachers and students*", "*distinguishing between textbooks as a primary basis for lessons and as a supplementary resource*" (pp. 370-371).

In the Spanish and Latin American field, we must mention the works from IARTEM and MANES. In

the field of History, we must mention Rüsen (1997) pioneer work and his proposal on researching about the textbooks of this subject. In addition, Valls (2008) study collects the contributions of the didactic of History and the textbooks, with a balance of the studies developed and a rationalized proposal of the research lines.

In all our studies, the textbook, the teachers' notes-materials and the Internet have been present in the classrooms. Therefore, we can assume that until Martinez, Valls and Pineda(2009), the textbook was the source of reference for teachers and students, although it is traditional to use it at the same time with the teachers' notes-materials; the use of Internet was scarce. Conversely, the data base collected in the courses 2012-2015, show a tendency in which the teacher's notes-materials are the first source used in teaching History and the presence of Internet is high in the classrooms (Martinez-Valcarcel 2018).

Marqués (2012) establishes a general classification of the digital media, and the roles they play on the students' training, which we draw attention to because it is important for this work, these roles are as: "communication channel, open source of information and didactic source" (p. 7). Finally, Haydn and Ribbens (2017) inform us how Information and Communications Technology (ICT) are being used inside and outside the classroom, this will help us to understand how the technological influence is taking place in the classrooms.

Methodology

Following Salkind (2017), this research is characterized as non-experimental descriptive. The criterion for determine the sample has been by "clusters" and "quotas". In order to select the centres (clusters), was considered the size of the population and localities. The number of students (quotas) was selected according to the required conditions; that is to say, students of 2nd High school of the 2015-2016 course. Specifically, 53 students from 39 centres (27 public and 12 private) participated, it represents 28.68% of the CARM.

The instrument to collect the data was a structured questionnaire involving the identification data, the use of the textbook, teacher's notes-materials and the ICT. It consists of 28 items: 17 questions (yes-no or Likert scale) and 11 open-ended questions that deepen the assessments made. The questionnaire was submitted to analysis by four experts and was tested with three participants.

Analysis and interpretation of the results

Regarding the results, it is worth mentioning the use of teacher's notes-materials, as they are present in the classroom in 98.11%, with a high frequency of use of 88.68%. Second, the use of digital media, which are present in all situations 96.23%, but with less frequency of use 41.51%. Third, the teachers use the

textbooks with a frequency of 37.74% and the their presence in the classroom is 20.75% these are always link to the teacher's notes-materials, which are present in the classroom in most of the cases.

The teacher's notes-materials

The central question tries to know the *presence, frequency and the reasons* for using the notes-materials in *teaching History.* Asking about *their use, the way they were provided, their updating and* if the *student had them new* or if they had been already used by other students. At the same time, we asked the students to support their answers.

We have appointed as the teachers' notes-materials to all the information the teachers provide to the students for the subject of History of Spain. These might range from small clarifications in the textbook, to the development of texts and materials that replace the textbook. The notes-materials have the following purposes: they provide prestige to the teachers in the subject of History of Spain, they solve problems in relation to the time available in the program and the amount of content teachers need to teach. In addition, these provide more understandable texts that help the students for the Test of Access to the University (PAU).

The notes-materials: *student's perception.* The students describe them as a "summary of the information gathered according to the teachers' experience in the subject of History". They allow them to follow the program faster; they help to alternate and connect information with the textbook; and, they are adequate for the demands of the subject. These notes can be from their teacher or from other teachers. When the notes have a wide extension, they might even be an alternative to the textbook.

The *teaching processes and the notes-materials.* The common situation is to provide the notes-materials to the students, before the teachers' explanation and the purpose is that the students pay attention and take notes, underlining, highlighting, and so on. Another situation is when the teacher explains first, and, shortly afterwards, provides the notes-materials, with the purpose that the student learns to point out the important ideas and to elaborate their own narratives. In both situations as some participants mentioned, the notes were essential for teaching and studying, being practically the only information, they had.

The assessment and the notes-materials. The exams of the subject or the PAU, are also mentioned by the students when they talk about the notes-materials. When the information is summarized in the notes, it allows the adjustment of the time available to make this kind of tests and are useful when the teacher wishes to fulfil the programme and not only the contents required for the PAU.

The notes-materials resources of distribution. The notes-materials are provided to the students by the teacher through diverse forms: photocopies in 60.38%, by Internet as a repository in 52.83%, or dictated in

39.62%, almost all the dictations are small teachers' clarifications that are included in the textbooks or in the notes-materials.

The notes-materials: change and continuity. The teachers' notes-materials have a more dynamic possibility to be *changed* than the textbook. The data indicate that there are about 15.09% that show annual changes in writing the notes, 67.92 % are from previous years and 16.99% do not answer.

The notes-materials reused by the students. According to the results 84.91% of the students use them new and 15.09% use the notes-materials already used by other students.

The textbook in teaching History of Spain

This section explains the presence and frequency of use of the textbook in the classrooms. The items are structured around two fundamental questions: *Was the book recommended by the centre?* and *Did the teacher use it?* After these two items, three more questions are formulated: *assessment made by the student about its use*, *the textbook is new or already used* and the student's decision for having the *textbook, although it is not compulsory* in the classroom, they rationalize their answers.

The textbook is used by 37.74% of the teachers, however, its presence in the classroom is low 16.98%. On the other hand, 52.83% of the students use the textbook, 15.09% more than the teachers. In the same way, there is a tendency to buy textbooks already used by other students thus 20.76% are new and 35.87% used.

Students' reasons for using the textbook. The answers show the following reasons: the usefulness for the subject 35.85%, the quality the textbook has for understanding the content 32.08%, the students use the textbook in the classroom and at home in 26.42%, they mentioned they have few problems to acquire it 28.30% and, its link with the teaching 37.74%.

Usefulness of the textbook. It is a source of information, even when the textbook is not compulsory. Thus, they mention the usefulness of the textbook as follows: it helps them to follow the rhythm of the class, the extension of the content allows them to better understand the ideas and concepts, it also assists them to complete their notes and makes it easier to improve their knowledge. The participants also mention the quality of the images, photographs, illustrations and texts in the textbook, they permit the students to do a better analysis on the 'comments of the text', so, the textbook is used in the classroom and at home.

The *acquisition* of the textbook was reported in 28.30%, it can be *acquired* in the second-hand bookshop at the school, from relatives or friends and some others prefer to buy it new. They point out that besides the textbook they use the touch board to record the most important ideas or schemes, as well as other digital resources due to the importance and complexity of the topics. In addition, the textbook facilitates

their learning and allows them to deepen their understanding of the most relevant topics.

The ICT in teaching History of Spain

The questions raised were related to the presence and frequency of the website of the centres and the use of the ICT in History, which included the functions they had in the teaching-learning processes. *The Web page and the ICT in the class of history of Spain: presence and frequency of use.* All centres have a Web page on the platform provided by the CARM (http://www.murciaeduca.es/mapa/). The presence of the ICT in the teaching-learning processes of History of Spain is 96.22%. *Web page of the centre.* The existence of the Web page of the centre allows the students to know what is going on in their institute, to manage certain administrative information and use it in the subject of History of Spain.

Absence of ICT in the classrooms. 3.78% of the students declare that they never use the ICT because they are not necessary according to the teaching strategy of the subject, or because their teacher was traditional.
Little or some presence of ICT in the classroom. It is valued by 54.71% of the participants. The teachers use the ICT to motivate, to make presentations, to present some videos at the end of the topic, to use some images to explain and PowerPoint presentations, among others. Nevertheless, the students use them to find information they do not understand, to clarify doubts, or when the teacher requests them to do it. Another use is to download notes, for half of the participants the topics to be studied are facilitated by this means.
Common use of ICT in the classroom. In total 41.51% of the students claim that the ICT are used with frequency to provide information or search for it, to interact with teachers or peers; and, to make the processes of understanding the content easier. They are also used to see their marks, the events programmed by the centre, schedules, tutoring, etc.

The functions of the ICT in classes of History of Spain. According to the students' statements, we have identified three functions: access to the information, as a teaching resource and as means of communication.
The I*CT as resource of information.* This activity is carried out by 94.34% of the participants, either by downloading documents or searching for information. The contents that constitute the subject of History are collected and selected in the textbooks and in the teacher's notes-materials. This fact means that the information obtained on the Internet is different and is increasing in the daily life of the teaching-learning processes. In addition, 54.72% of the use of the Internet is to "download" the teachers' notes-materials, the purpose is to have them in order to enrich and understand the class better. Looking for information is carried out by 67.92% of the participants. This activity is present in the classrooms and at home, this

supposes a greater complexity than just downloading the notes-materials. It implies knowing what they are looking for and where to find the information, validating it and making decisions about what to do with it when they contrast this information with the textbook, and the teachers' notes-materials. It should be noted that the Internet is an easy and quick way to get information, although teachers warn for the reliability of the source. This activity might be immersed in the dynamic of the class, because the student looks for information in order to ask about it in the classroom, reason why the teacher encourages them to research in order to complete the information about the topics.

The ICT *as didactic resource*. Under the concept of didactic resource we have collected three kinds of contributions which are related to improve their knowledge, that is to say, increase the information 56.60%; however, 75.47% use them to perform tasks in class, to contextualize, to motivate, to visualize, to illustrate very complex contents through documentaries, among others.The Internet is employed by 92.45% of the participants in this research.

The ICT as a communication resource. The number of participants who mentioned this category is rather low 22.64%, but it is a percentage that implies a progressive incorporation of that possibility into the face-to-face teaching-learning processes. It mainly emphasizes the communication with teachers and students, as it opens a space to explain doubts (when there was no time in the classroom), to ask for further sources of information, and to consult their marks. What is more, it is useful for the relationships with other students in order to do their tasks together from their own homes, as it allows them to work in different spaces at different time. Finally, it is worth mentioning the student's own relationship and sense of belonging with the centre where they study, due to the aforementioned reasons they like to know about a wide array of activities the centre schedule for them, which go beyond those carried out in each subject.

Discussion and conclusions

This research line is focused on knowing what usually happens in the classrooms of History of Spain. It is a previous step to understand, interpret, innovate and propose other ways of teaching or research options. This work is based on the *use of the textbook by teachers and students*, the teachers' notes-materials, and the ICT, advising the need to analyse them jointly due to the existing interrelationship between them. When we refer to the textbooks and teacher's notes-materials, it is not in a general way, but from which we have been analysing (Martinez- Valcárcel , 2016 -2018) "the use that teachers and students do with these media". More specifically, this study focuses on what Hansen (2018) notes "the modification of textbook by teachers and students" (p. 37). Furthermore, Kolbeck and Röhl (2018) studies are also

essential, as they state that "Teacher and students using textbooks transform and adapt them by selecting texts and interpreting their content" (p. 403). The most relevant results differentiate between the presence and frequency of the three media in the classrooms, moreover, it should be noted that they are not exclusive to each other, but complementary with different influence on the teaching processes.

Concretely, the teacher's notes-materials are in most of the declarations with a high frequency of use, nine out of ten students. This resource is the selection, transformation and creation of teaching contents of History of Spain by the teachers. The third part of the students use of the textbook is with a frequency of 21% and always linked with the teachers' notes-materials. The influence of the book is clearly expressed by the participant 9016: *"(…) It was a fairly extensive book with lots of photographs and, what interested the teacher most, was a number of texts in order to analyse them and thus be well prepared for the Selectivity"*.

The ICT are present in almost all teaching-learning situations but with less frequently use in 42%. Not being as the most sophisticated and expensive, but those that were easy to access and could help the teacher to teach the main concepts of History of Spain as Haydn and Ribbens (2017) mention. More specifically, the resources of information, teaching and communication; and, the relations between teachers-classmates and even with the institute itself have been identified. In this study, was also established that the participants tend to reuse both the textbooks and the teacher's notes-materials.

In summary, it is highlighted; on the one hand, the importance of starting from the *use* of these media and distinguish between their *presence* and *frequency* of use in the classrooms. On the other hand, referring to the results obtained, it draws the attention to the importance of teacher's notes-materials, the interrelation between the media, as well as the role of digital resources in the classroom.

Finally, the results and the interpretation that has been made raises new research questions, from which four stand out: What influence does the textbook have in the teacher's notes-materials? What tasks do students do? What processes and means do students use to complete their tasks? These are some challenges that, encourage us to continue in this exciting world of researching.

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Didactic materials and ways of their use during preparation for Art Education lessons in basic education

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Abstract

This paper deals with didactic materials, or more precisely, with how Art Education teachers are using them to prepare for their lessons at primary and lower secondary schools. Mixed research design was chosen, specifically *explanatory sequential mixed methods design* (Creswell, 2014), to allow us to better capture (quantitative phase) and then describe (qualitative phase) this largely unexamined area. Results being especially the three scales at whose poles are located six different modes in which respondents use specific didactic materials.

Key words

Didactic material, Art Education, basic education

Introduction

Within basic education, Art Education[42] is a compulsory subject and some authors (Slavík, Dytrtová and others) are describing it as an *expressive discipline*. In other words, counterpart to subjects originating in exact science. In practice, Art Education is understood as active discipline and is often confused for Arts & Crafts (i.e. more handicraft discipline, with emphasis on the product).

However, according to The Framework Educational Programme (FEP[43]), Art Education also includes a significant portion of cognitive and communicative component. It is apparent on three basic domains of teaching: development of sensual perceptiveness, application of subjectivity and verification of communicative effects. Therefore, it is not only about the artwork itself but also about the communication **through** creation and communication **about** creation.

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[42] It focuses on Fine Arts.

[43] FEP represents the national curriculum level. It defines the binding scope of education for its individual stages (for preschool, elementary and secondary education).

The subject of Art Education is in Czech Republic characterized by a high percentage of teachers without approbation[44] and by the almost complete absence of textbooks and teaching texts with a valid approval clause of the Ministry of Education, Youth and Sports (Valeš, 1997; Slavík, 2005; Brücknerová, 2011).

Textbooks and teaching materials for this subject, provided with an approval clause of Ministry of Education[45], are quantitatively in a great disproportion compared to most of other school subjects. They are consisting of the same publications used within last fifteen and more years that only have a prolonged validity of the clause.

Extensive research projects are usually not concerned with Art Education. One of the reasons might be the absence of textbooks and educational materials used in practice. Sikorová & Červenková (2010) were observing 18 subjects combined into subject groups during their pilot study. Art Education and Music Education were combined as *aesthetical and educational disciplines*. Time of textbooks usage during these lessons was 0 minutes. For that reason, the authors did not deal with them any more and decided to focus the further research only on mathematics, English language, history and civics education. However, the authors note that *"(...) even the absence of textbooks within school lessons indicates their role in the educational process."* (Červenková, 2010, p. 14)

Accordingly, in this article we focus on which didactic materials[46] are used by Art Education teachers at primary and lower secondary schools in their preparation for teaching, based on which criteria they choose them and how they exploit them.

Methodology

Established research problem is a territory which we know especially from our personal pedagogical experience and to which no significant research projects are related. Therefore, it appears the most appropriate research design is mixed methods research as it has the potential to map said area and, simultaneously, to focus in more detail on specific cases.

From its possible variations we chose so-called *explanatory sequential design* (Figure 1) because it fully suits our needs. *"It involves a two-phase project in which the researcher collects quantitative data in the first phase, analyses the*

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[44] Teachers are required by law to have appropriate level and type of education, however their filed specialization is often in disproportion compared to subjects they teach in reality.

[45] Two five-part series: *Obrazárna v hlavě* [A Picture Gallery Inside a Head] and *Průvodce výtvarným uměním* [A Guide Through Art].

[46] We understand them as *material didactic resources* defined in the broad terms – as printed publication that can be used by the teacher in preparation for their lesson – accordingly, they are not only textbooks but also non-fiction and fiction, art and craft activities idea books or grey literature (academic qualification works, collections of conference volumes or work and worksheets from museums and galleries).

results, and then uses the results to plan (or build on to) the second, qualitative phase. The quantitative results typically inform the types of participants to be purposefully selected for the qualitative phase and the types of questions that will be asked of the participants. The overall intent of this design is to have the qualitative data help explain in more detail the initial quantitative results. A typical procedure might involve collecting survey data in the first phase, analysing the data, and then following up with qualitative interviews to help explain the survey responses." (Creswell, 2014, p. 224)

Figure 9 – Explanatory sequential mixed method design (according to Creswell, 2014, p. 220)
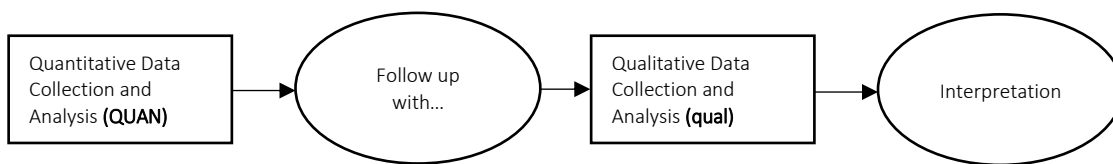
Quantitative data collection and analysis

We chose the following research questions for the quantitative phase:

A. Which types of didactic materials are used by teachers in preparation for teaching Art Education at primary and lower secondary schools?

B. How are didactic materials exploited in preparation for teaching Art Education at primary and lower secondary schools?

C. Based on which criteria do teachers choose didactic materials to use in preparation for teaching Art Education at primary and lower secondary schools?

Questions further observe differences by:

• Grade of class the teacher works with

• Length of practice

• Approbation (only teachers of lower secondary school)

Prepared and piloted questionnaire, consisting of both open and closed questions, was sent to email addresses of all primary and lower secondary schools in CZ (4115 addresses).

Results of the quantitative phase

We evaluated 720 valid answers (i.e. 30 % of open questionnaires).

Average practice length of respondents is 18.6 years and more than 60 % of them are teaching all of the subjects at primary schools. On the contrary, only 3 % of respondents are teaching Art Education subject only.

Most often used resource is **internet**. 62 % of respondents listed that they use internet *very often*, on the other hand only 0.7 % listed that they *never* use this resource. Least used resources according to respondents were **radio programs**. 69 % of respondents *never* use them.

If we focus on resources to which most respondents chose option *often*, we will find that they are **printed publications**. This option was chosen by 27 % of respondents. At the same time, printed publications reached second highest number of answers *sometimes* – 46 % respondents. Third most used resources are then **artworks created in another teacher's class**. They are *often* used by 48 % of respondents.

Chart 1 – Question 1: How often do you use listed resources in preparation for teaching Arts Education?
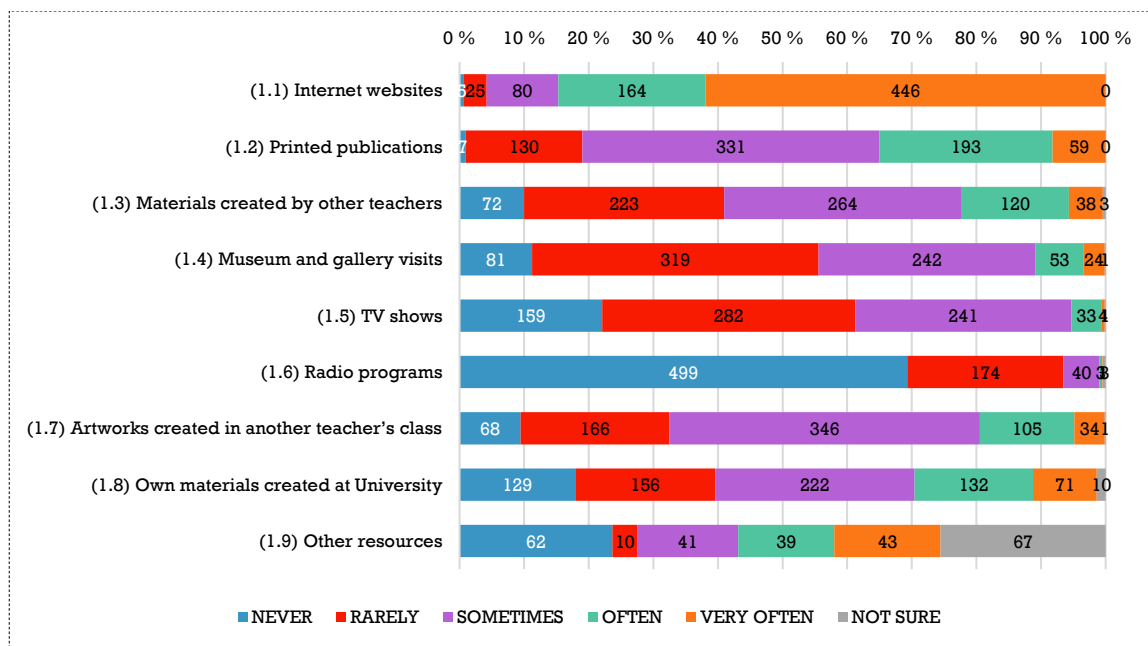
Based on grade of class the teacher works with, length of practice and approbation we can say that:

• Teachers functioning at lower secondary school and teachers with approbation show higher amount of orientation on Fine Art.

• Teachers functioning at lower secondary school and teachers with approbation show more autonomy.

• The length of teachers practice plays negligible role, except for

According to the respondents the most used are **publications with ideas for creative activities**. 39 % of respondents chose option *sometimes* and 31 % option *often*. Another highly frequented used printed resources are **materials from workshops and seminars**, **fiction** and **templates and colouring books**. Templates and colouring books have second highest number of answers *often* (21 %) and materials from workshops and seminars have second highest number of answers *very often* (7 %).

On the contrary, the least used resources are **non-fiction publications – other fields**, 28 % respondents listed that they *never* use them and 40 % use them *rarely*, and **exhibition catalogues**, 41 % of respondents *never* use them and 31 % only *rarely*.

We consider interesting the comparison of answers to question **arts education textbook** and **other subject textbooks** as their use is in many ways comparable, especially option *sometimes*. Arts education textbooks are used in this way by 28 % respondents and textbooks of other subjects by 31 % respondents.

Chart 2 – Question 2: How often do you use listed printed publications and educational materials in preparation for teaching Arts Education?
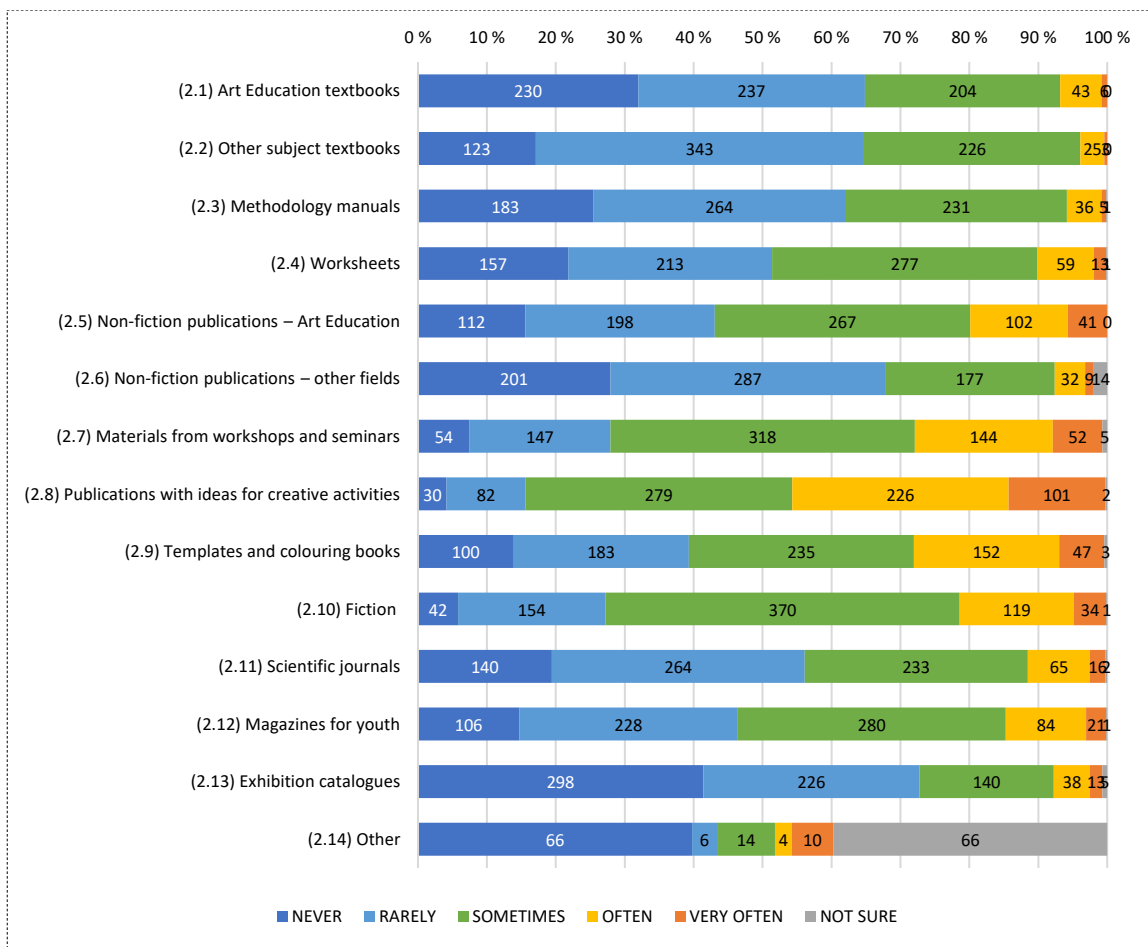
Respondents most often use printed publications and materials in following ways: **as source of visual material** and **as theme inspiration**. A little less frequent is then use **as source of technical procedure** and **as "manual"**. The least amount of use was listed for option **as source of pedagogical procedure** (*often* was listed by only 14 % respondents and *very often* by 3 %) and **as source of scientific information** (*often* only 13 % and *very often* 4 % of respondents).

Answer *sometimes* was listed by respondents very equally. 35 to 41 % respondents reacted in this way to every sub-question (except 4.7 **Other**). This would imply that occasional use of listed resources takes place to a high degree in all listed ways.

Chart 3 – Question 4: How do you use printed publications and materials in preparation for teaching Art Education?
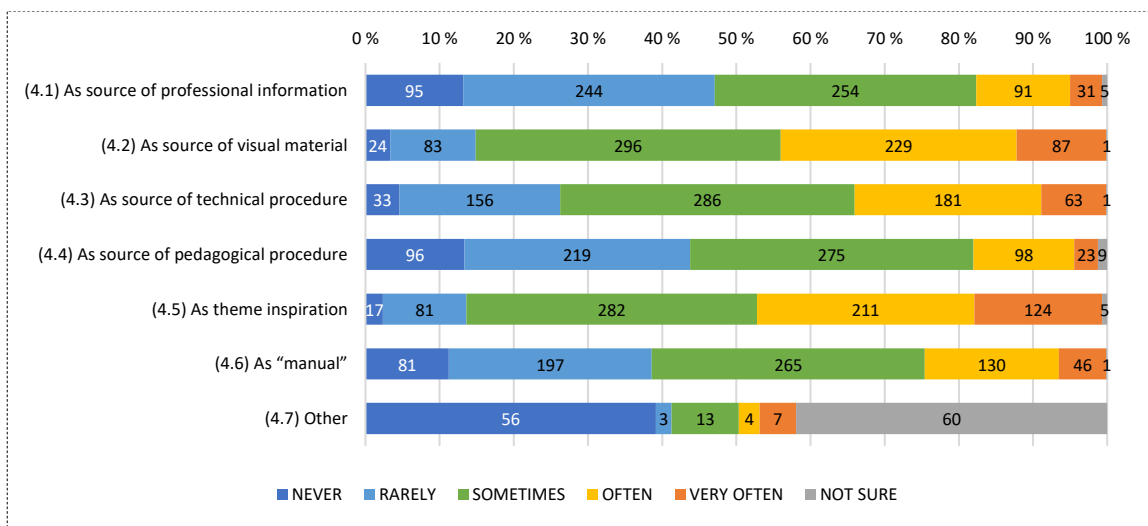
Question "*Which criteria is important for you when choosing printed publication used in preparation for teaching Art Education?*" was focused on the criteria, applied to printed publications by the teachers. Answers were grouped into 29 categories. The most frequented categories were: *Graphic and print processing*, *Amount of information contained*, *Recommendation*, *Availability of publication* and *Other*. Category *Other* includes the least frequented answers that usually occurred only once. The criteria chosen by all respondents did not differ fundamentally from the criteria applied by individual groups (based on grade of class the teacher works with, length of practice and approbation).

Qualitative data collection and analysis

We decided to follow up on question B for its formulation is open enough and we could significantly enrich data obtained in the first phase (respondents had to choose from predetermined options and had only a small space to expand their answers).

B. How do teachers exploit didactic materials in preparation for teaching Art Education at primary and lower secondary schools?

Our sample consisted strictly of respondents of the previous questionnaire, which provided their email address. We have chosen a method of intentional sampling in accordance with J. W. Creswell`s recommendation (p. 224). We chose our respondents by grade of class the teacher works with, length of practice, approbation and size of municipality. The respondents also had to represent a variety of approaches in frequency and way of inspirational resources and printed materials.

Table 1 – Division of respondents in terms of length of practice, degree at which they teach Art Education, approbation (relevant only for lower secondary school) and character of the school

		Dana	Emilie	Ester	Hedvika	Jarmil	Jindřich	Kateřina	Libuše	Linda	Milena	Nela	Petruše
Length of pedagogical practice	0–2 years		•					•					
	3–9 years			•									•
	10–19 years				•					•			
	20+ years	•				•	•		•		•	•	
Degree	Only primary school	•			•	•							
	Only lower secondary school						•	•	•				•
	Both		•	•						•	•	•	
Education	Approbation						•	•		•			•
	Without approbation		•	•					•		•	•	

Size of municipalit y	Suburban school				•	•	•		•					
	Urban school	•	•	•				•		•	•	•	•
Focus of school	With focus							•		•	•		•
	Without focus	•	•	•	•	•	•		•			•	

We carried out 12 semi-structured interviews of an average length of 79 minutes. After transcribing them we were working in the environment of analytical software Atlas.ti. Due to chosen research design and predetermined research question we did not use the usual open coding "line after line" but we have focused on sections that are relevant to this question. Therefore, the process is approaching *focused coding.* (Charmaz, 2006)

Results of the qualitative phase

The coding results are represented by categories and sub-categories, listed in Table 2.

*Table 2 – Structure of categories based on foundation of focused and selective coding*

Title of category	Title of sub-category
Authorship	Inspiration
	Manual
Respect	Authority
	Mass
Orientation	Dictionary
	Journal
Time	Micro
	Macro
Specific didactic materials	(Codes with titles of specific didactic materials)

Now, we will gradually introduce three scales on which respondents repeatedly moved while describing how they use didactic materials in their preparation for teaching. Each scale has two opposite poles. We assigned a specific mode (= way) to each pole in which respondents use didactic materials.

Even though the scales are bipolar they do not have positive or negative connotations in the sense that either of the uses of didactic material would be "right" or "wrong". These connotations can be supported only by specific use of didactic material and conditions.

Figure 10 – Scales and specific modes
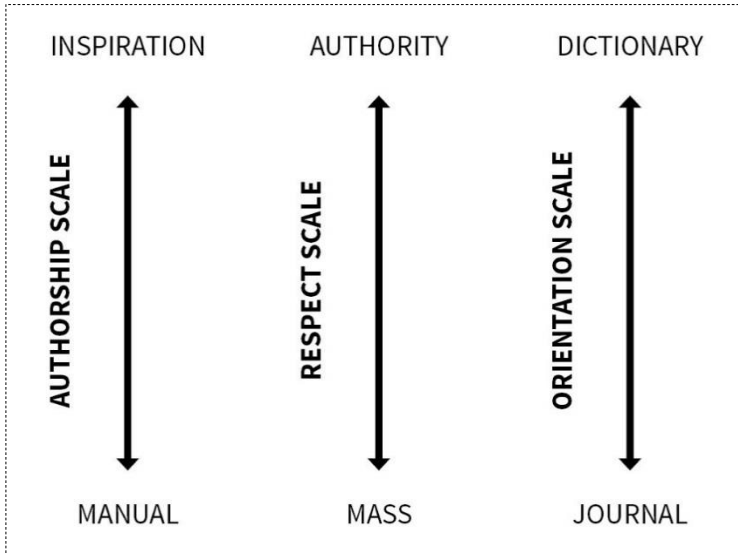
Authorship scale

This scale describes, to what extent do teachers rely on specific didactic material. Is it just a primary *inspiration* or are they following it step by step, as a *manual*?

Inspiration

It can be thematic, material, technical, methodological etc. Teacher finalizes the preparation with use of other resources. E. g. Jarmil was inspired by the book Stranalandia[47]: *"It's actually an island where only a single person lives. And then there's the nature described, and different fantastic animals. It's perfect. (…) So, then the kids each get one of the animals and they have to somehow finalize it and then it gets stuck on the map of the island which they also create as they want."*

Manual

This way of use is characterized by a low rate of authorship. All respondents had experience with it, independently of their approbation, grade of class the teacher works with or length of practice and approbation. E. g. Emilia is working with publication TOPP: *"So here, it is more or less the series, how many of*

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[47] Stranalandia, Stefano Benni, 2004.

these do I have at home, probably like four. (…) They are, like, really great, often, you know, you can copy these templates. You show it to kids or they can eventually even copy it. That's, like, really great and it's, like, very illustrative for them, especially."

Respect scale

This scale describes the personal relationship of the teacher to the didactic material (their content or author). The teacher either "looks at" the material in some way (*authority*), or it is something "ordinary" to him, from which he simply draws the necessary information (*mass*).

Authority

This way of use was often related to the personal experience with the author of the publication: *"I always go back to Věra Roeselová* (Note: Czech didactic of Art Education, functioned at Charles University in Prague) *her publications are exceptional, because I like to work with those lines and projects. And very often I have a look at how she described it to see, if I took in account everything I wanted. That is always my correction."* (Linda)
Some of the respondents were talking about feeling lack of authority, or its need (Ester). Other respondents respect the authority of didactic materials of other subjects they teach (Emílie).

Mass

Author, annex or primary idea are not important, importance is mainly on visual information. In statements of respondents this mode is often found in rather minor suggestions – in phrases as "I also look at that" or "whatever I see", which emphasize visual component
Jarmil was using a Lidl leaflet in this way: *"We're discussing how people lived in times before, I have some leaflet from, I don't know, from Coop or Lidl. They once came out with that Christmas offer, what's on sale and stuff. And there was a reproduction of Lada's winter landscape* (Note: Czech children books illustrator) *of kids sledding and you can see that muff, right, how they wear these clogs or what, and that the sledge didn't have any string and they are not made of plastic but they have a pole there, right. Well, that's what I based it on, right, I still have a pile of those stashed at home and they get the reproduction ripped out of the leaflet and make arrows and write down what's different (…)."* In this case, a hypermarket leaflet becomes a didactic material for a moment. During his preparation the teacher uses only its visual part and provides it to the students for one time use instead of copied template.

Orientation scale

This scale describes how purposefully (or, on the contrary, randomly) teachers work with the content of didactic material. Whether they are well oriented and progress clearly in a given direction (*dictionary*), or whether it is rather "flowing" (*journal*).

Dictionary

In this way the teacher is looking for a specific word, the publication is a part of mosaic of more didactic materials for them. Linda describes this way of use, when she prepares the lesson about expressionism: *"For me, the basis will be some literature, so I will probably look at some texts about expressionism from several publications, then I will probably focus on some phenomenon how expressionists work with colour, line, what's the basic idea and then, I will look for some examples on which I could show it to them, then I will maybe want to show them two paintings and I will want them to work in groups and for example find something that I talked about and try to formulate it in their own words. (…) I will look for, for example, exhibitions, that are happening right now, that it would be possible to go to."*

Journal

This way of use is characterized by the fact that the teachers do not focus on any particular point. They do not know exactly what they are looking for. Didactic material is consumed by them in a similar way to the daily press – some of the information will be only skimmed through, by other they will be so impressed that they will use it in preparation for the lesson. It is mainly related to the themes and techniques used in the lesson.

Petra is describing its use in connection with Creative Amos journal: *"our school, or the principal, it's probably already established for some years, so he's subscribed to it, so it's actually, I would say, the only source that the school takes care of, (…) so I get it regularly and I always flip through it, browse and if something catches my eye I either include it in the school year, that is already happening or sometimes there is like an extra class (…) so I do it there."*

Discussion | Summary of quantitative and qualitative phase of research

Presented scales are definitely not exhausting and they are based solely on the interviews, not on the direct observation of the teacher's preparation for lesson or actual teaching. However, it is obvious that presented ways of use of didactic materials permeate the whole professional community of the field. Even though, they take place during preparation for the lesson (and then influence teaching and its reflexion), their realization resides on the practical level, however, they are conceptually linked to other levels – the theoretical level (in the interviews with teachers, recounts of university education which

influenced their use of didactic materials or types of materials they use occurred most often) and the curricular level (includes teacher's relationships and views on FEP and SEP[48] and the way they implement didactic materials into these relationships).

Selected research design provided us with the opportunity to "uncover" data obtained by quantitative methods, which can be seen on example of the relationship between internet and printed publications.

In Art Education, as we viewed it through the research, activity prevails over its planning and reflexion, theme and topic over its content. Right in the answers to the first question of the questionnaire respondents listed that main source of their inspiration is internet, in second question they admit that they rarely use Art Education textbooks.

Respondents are talking about time efficiency made possible by using the internet: *"People use internet, I don't know, we have interactive boards at school so often I'll help myself out that way, that I will quickly find something that I need and show it to the pupils"* (Linda). But they also mention the opposite effect: *„And so there's too many ideas, so many times I sit at the computer for like two hours and browse and I find something that I like, but I browse some more and find something I like again, so to choose, what's going to happen with the kids, is often a problem"* (Dana). But during the interview we found out that even two hour long browsing through the realm of internet brings teachers to a small creative etude. *"On the internet I especially look for specific artworks, (…) it already has a form, it's simply finished and there, I would say, it is rather the other way around. In the book I go from the beginning to how it's going to look in the end while, for example, on Pinterest it is already done and often it isn't even in Czech or it doesn't have any description and then I have to go the other way around. Try to find out how they even got to the final picture"* (Libuše). We gave this phenomenon a working title of reverse engineering and in connection to internet it was mentioned by four respondents.

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[48] SEP (School Education Programme) represents the school curriculum level. It is created by each school according to the principles prescribed in the respective FEP.

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Science textbook: (re)signifying its usage in a countryside school

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Abstract

The textbook that contemplates curricular subjects from the earliest years of Elementary School up to High School and is distributed to all Brazilian public schools through the National Textbook Program - PNLD, constitutes a very important support material for teachers and students in the dynamics of the classroom. Being part of a specific social group, these teachers and students disseminating and reproducing, to a certain extent, key elements of their local cultures, articulated to others, arising from social world, which are subjected to a constant economic, political, and technological movement, characterising idiosyncrasies of each community whereto they belong. Understanding that in school there is an interweaving of cultures as pointed out by Pérez-Gómez, and ethnographic research as a methodological possibility that allows entering the daily life of a social environment and establish direct contact with elements of the various cultures present in it, according to the theoretical assumptions of Ezpeleta and Rockwell, an ethnographic research was developed with the objective of identifying and verifying the influences that these cultural elements exert in the use of textbooks. The research was developed accompanying the pedagogical action of a Science teacher at a countryside school linked to the State Department of Education of the State of Paraná, southern region of Brazil, as well as through questionnaires answered by the parents or guardians of the students. Being an ethnographic research, which presupposes an extensive period of the actions of a subject or a social group, during nine months, from March to November 2016, weekly the teacher's classes were observed which provided an approximation with the teacher, the students and the local community. The observation showed that the teacher's experience in using the textbook as a resource for her activities was important for the actions developed in the classroom and evidenced the considerable and manifold role that the Science textbook plays at the teacher's daily planning, which was coherent not only with the curriculum organization that emerges from the public policy in vogue, but also with students' background social context. The research

analysis also showed how the teacher deploys both texts and images brought by the textbooks as references for students to learn school contents in parallel with local knowledges, experienced by these subjects within their community, as well as with knowledges that arise from media resources. Textbooks, as our reading suggests, were also present in the daily life of each family, understood by parents as a pedagogical resource amenable to transformations over time – especially if the universalisation of their access is taken into consideration. The recognition that elements belonging to the local culture are crucial to classroom dynamics has also been an outcome of this research. These elements were often mediated by the teacher through textbooks, which allowed the establishment of associations between knowledges that were either didactic or inherited by the subjects throughout their own trajectory as part of the specific social space whereto they belong – in this case, a countryside community.

Keywords

Textbook. Science teaching. Countryside school.

Introduction

The school, according to Ezpeleta and Rockwell (1989), has cultural elements that give visibility to its local identity, at its own pace and rites, constituting itself in an institution that welcomes diverse social subjects. This issue has to be taken into consideration when it is intended to comprehend the relations of these elements in the dynamics of the teacher's pedagogical practice, in that he is responsible for the mediation between the institutionalized knowledge and those from the local culture and its agents. Pérez Gómez (2004) ponders the existence of an entanglement of the different cultures molding the school's dynamic in a mediation process between the behaviors, feelings and conducts existing in the complex exchange and construction of meanings of each subject participating in the school's life.

According to Williams (2011, p.55), "any educational system will reflect the content of the society", which indicates that the school, as an institution that holds elements of a society in movement, can be understood as a coexistence of many diverse forms of culture and cultural dimensions. In this sense, the school cannot be considered static, however, as also stated by Forquin (1993), it presents characteristics of own life that are indicative and propelling of continuities and stability, as well as discontinuities and destabilizations in their environment.

Using these concepts as assumptions, it is sought to recognize the cultural elements that are entangled in the usage of textbooks by a Science teacher of a countryside school, aiming to show the challenges for the debate processes of this resource in the specificity of a local reality.

Methodological Procedures

The search for the cultural relations present in the classroom was performed through an ethnographic research, a methodological option that allowed, in everyday school, a direct contact with the possible means to describe and recognize the subjects involved in the learning and teaching process in a school's particularities. The presence of the researcher in the school allowed to uncover what, according to Ezpeleta and Rockwell (1989), constitute the "real plot that articulates the local stories, that it is important to know, because it is both the starting point and the real content of new pedagogical and political alternatives." (pp 11-12).

The ethnographic work was done observing the science classes of the teacher Ana[49] for the 6th grade classes[50], during the school year of 2016 (March to December) in a countryside school, placed in a municipality linked to the Irati Regional Education Center[51], in the Paraná State, Brazil. Furthermore, interviews were conducted with the management of the establishment, with the pedagogical team and with the class's Science teacher. In order to carry out the empirical work, it was needed the formal authorization of the State Department of Education, as well as the consent of the school board and of the teacher.

Understanding the school as a crossroads of cultures, as stated by Pérez Gómez (2004), the information gathered through observation, through questionnaires and through interviews were analyzed according to the following categories:

- *The use of textbooks and the curricular organization;*
- *The use of textbooks and the rites of the school and its subjects;*
- *The use of textbooks and the local culture.*

Some of the details of the performed observation are presented as following, according these categories.

The use of textbooks and the curricular organization

The teacher Ana always brought several materials to the classroom – textbooks, indications of the sequences of knowledge that will be developed with the students, attendance book – selected according to the orientations that were elaborated and articulated by the public educational policies that shaped, among other aspects, the teacher's pedagogical dynamics of her activity in the school.

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[49] The name is fictitious to preserve the teacher's identity.

[50] Approximate age of 10 years old.

[51] https://www.google.com.br/maps/place/Irati,+PR,+84500-000/@-25.5550979,-50.1841651,6.61z/data=!4m5!3m4!1s0x94e7d5636b15dcab:0xedae44357c67bd29!8m2!3d-25.4700302!4d-50.6509459

It was possible to verify that the Science textbook was handled in almost every Science class and was, in the teacher's activity, an important pedagogical support for the routing of the contents proposed by the Curriculum. The teacher, however, reorganized them, given that what was prescribed by the guidelines was not always aligned with the didactical needs established by the dynamics of her class.

On the other hand, it was also possible to verify that there was a strong influence of these materials, mainly the textbook, in the daily life of the classroom and that they play a guiding role between the curriculum normalized by the government agencies and the effective curriculum of teachers on their pedagogical action, aspect that was also verified by the research developed by Aguiar and Garcia (2017). In addition to being a material with many alternatives to start or to continue the contents, the textbooks also play the role of research instrument so the students can seek diverse information of the proposed themes proposed in the classroom. Besides the books used by students in the classroom, in the school's library was available some collections of textbooks of the PNLD of previous years, which were left in this space to be used by the school's community.

Regarding the usage of Science textbooks by the teacher it was observed that adaptations are done that indicates that she, by not simply using the book that the students possess, is, in a certain way, meeting their expectations and needs relating to the understanding of the contents covered, as seen in the following ethnographic records:

> Teacher Ana says: open the book on the page 92. As she was asked by a student about the previous pages that were not read, she comments: (…) we will still study the content of these pages, but today we will continue on water pollution. (Field Record, 01/06/2019)

> [...] As she was asked by a student about the book she was using, going over the activities on the chalkboard, which were not the 6th grade, the teacher comments: this book belongs to the 7th grade collection however, there are texts and activities that can be used in the 6th grade, such as the hydrological cycle we are studying". (Field Record, 22/06/2016)

The Science textbook participated of the teacher's pedagogical dynamics at various times in her daily planning and use with the students and, even though it happened many curricular changes along the years, some collections have remained, with some adaptations to meet the current curriculum.

The use of textbooks and the rites of the school and its subjects

The textbooks were Always present in the teacher Ana's classroom because, for her, "every time there is Science Classes, the student must always bring the textbook" (Field Record 23/03/2016). Even in the

classes that the book was not being used, it was possible to notice that the students left the textbook over or under their desks. Thus, they were part of the daily life of the teacher and the students.

The relation established by the teacher with the textbooks were built through her experiences gathered along her trajectory as teacher. Her expectation with the chosen current textbook was that it could contemplate the subject conceptually, which, according to her, it has not been confirmed, which is why she has already expressed concern about the next choice.

> I always use the textbook that were distributed for the school, but the book used this year by the students is not very good, which is why I must complete with other textbooks […]. In the year this book was chosen I was not in the school, but this year the next book will be chosen and I already know which book I will choose, because I have used and use it a lot […] and even when I was a student I used the books of these authors (she shows the book). […] It is not always that it is available all the collections approved by the PNLD in time for our choice, and in the specific case of the book I have chosen this year I brought from other school, because here this book was not handled yet. (Teacher Ana interview, 2016).

It is important to remember that the books handled to students are taken daily to their homes, thus they are part of the student`s family environment, as verified in the following dialogue established between the teacher and a student:

> [...] the student's attendance call is interrupted when a student reports that he was reading the Science textbook with his mother and that they performed an experiment with a candle, a cup and a water basin and show the page to the teacher. She pauses the attendance call and asks: and what did you noticed with the experiment? The student describes what happened and the teacher perform the mediations: […] yes it is the presence of oxygen that is an existing gas in the air, along other gases that we shall study in other classes […]. (Field Record 25/05/2016)

Moreover, it is important to highlight that the experimental activity pointed out in the previous report was not yet been addressed by the teacher, once it was related to a content that was still to be developed. Thus, the perception of the attention given by the teacher to the student was significant and that there was, through the textbook, a spontaneous interaction between the family and the didactic knowledge.

The parents or responsible for the student were also involved in the investigative process. During the observation period, it was developed an instrument that aimed to obtain reports from the parents or

responsible of the students regarding their memories when they were students and the students were prepared to apply it in their parents or responsible. Basically, in the instrument parents were asked to talk about their schooling and the books they used. Through the reports it was possible to infer that the current textbooks are, in a way, handled by the interviewed people, because they recognize that there are differences between the books they used when students and the ones currently in use by their children. Similarly, they were also able to establish relations between their school experiences in the use of this resource.

In this sense, according to Bourdieu (1996, p.248), a book never comes unmarked to a reader. It is marked in relation to the system of implicit classifications (…) and when it arrives to a reader, it is predisposed to receive marks that are historical. For every person that participated in the school's environment, the book have left some sort of mark and surely, not only in the pedagogical field, but also as an element of their story as a professional and subject that influences and is influenced by the social transformations.

The use of textbooks and the local culture

In the teacher Ana's Science classroom, the school's subjects were inserted in a community that present a daily dynamic built and rebuilt historically, that is, there are cultural traits that identify the customs and particularities of these subjects while acting in a specific place:

> [...] the teacher asks for the students to open the textbooks in the assigned page. When flipping through the book one student sees an image and comments with his colleague that it looks like a road full of potholes such as the ones where they are from. The teacher asks: Has everyone opened the book on the page I asked? […] so let's read the text together (she starts reading and the students follow). During the reading she makes some pauses and asks some questions: what do you understand for society? […] how do bees, ants and termites live? The students participate of the discussion and there are comments about beekeepers from the community, the honey and wax that is used to bless children. One of the students describes all the activities needed to become a beekeeper. The teacher proceeds with the reading of the textbook and one student interrupts her commenting that his uncle produce honey e that is why he knows that the flavor depends on the flowers nearby his house. (Field Record, 04/05/2016)

The actions that permeate the beginning of the content approached by the teacher enabled a recognition, in the book, of the daily life of the subjects. The content studied reverberated what they experienced and the discussions that followed the reading of the texts were articulated with local traditions, such as the

search of the families for the blessing ladies that, according to Oliveira (1985), can be understood as a "popular scientist that possess a very peculiar way of healing: combine the mystical of religion and magic tricks to knowledge of popular medicine (p. 25). This activity of "blessing" is very much present in the communities of the region and the knowledge of the people that perform it constitute an identity that has been passed on through the ages to the generation. Thus, there is the reflection of these teachings that are transmitted to families and being consolidated in the attitudes and speeches of the subjects, articulating with the school knowledge.

This is a local reality that is known and recognized by the teacher, who is also from this community: "school families are from the countryside and a lot of information about what I teach is related to the realities of the students that learn many thing with their parents and with people from the community." (Teacher Ana, interview, 2016).

In this approach between the knowledge brought by students that were learnt by living with their families and in the community with the scientific knowledge present, teacher Ana establishes networks of exchange between the knowledge brought by the textbooks and those that are related to the local reality, according to the report of the teacher in an approach about medicinal plants in the classroom that "they must be used in the student's homes, however, they must be careful and know these plants very well since they can harm, and that is why there are people that study this subject and then it is possible to know it is good or not to use." (Field Record 18/05/2016).

In line with this exchange of knowledge, the teacher also points out that "there is a lot of wisdom in *older* people, since they have had many experiences and bring knowledge that must be respected by everyone" (Field Record, 18/05/2016). It can be inferred that, for her, corroborating with Pérez Gómes (1998, p. 85), "life in the classroom must be interpreted as a live network of exchange, creation and transformation of meanings.".

Considerations

Teacher Ana's Science classes presented a characteristic ritual, in which the approach of the contents aims to respect the fulfilment of the curricular norms, but also to mediate the frequent interruptions of the students. Mediation that respects and gives voice to student contribution, that, frequently, incorporate the knowledge gathered while living with their families and in the traditions remaining in the community. In this sense, she meets the needs of students, both conceptual and those arising from situations generated momentarily and even unexpectedly, under diverse aspects that does not always correspond to the content given.

Regarding the contents, the presence and use in the classroom of textbooks was expressive, showing and authenticating its importance for both the teacher, as a guiding pedagogical resource in her practice, and the students, that handle it in the classroom and beyond. Even though its usage was frequent, it was evidenced that students felts attracted by these materials, especially by the images that arouse interest and generate relations with local facts and events as they allow to discuss their perceptions about diverse media interactions.

This became clear in the discussions during the presentation of the scientific knowledge such as during the student's crosstalk, in which the images generate comments, that were mediated by the teacher, that establishes relation with the community's daily life.

Furthermore, it was possible to realize that it was possible to establish a relation between the contents of the textbook and the propositions of the educational reforms. Even though these changes are happening, in its scholar practice, teacher Ana sought to make the guidelines advocated in line with those presented in the books, without however, not meeting the demands of the students and incorporate their contributions into her practice.

It was noticed that the interactions among the students was constant and the "patience" in listening ang guiding them from the necessary interventions indicated that the learning was performed in a dialogic process between the subjects. This dialogue portrays the knowledge that students are accumulating through information and knowledge from other places, even without leaving their community, as well as the experiences accumulated in the family trajectory and as subjects of the rural community.

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The perspective of Natural Science teachers on the meaning and use of didactic materials in the final grades of Elementary School

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Abstract

This paper presents partial results of the research whose main objective is to investigate the meanings and uses of didactic materials in the teaching of Natural Science. Didactic materials contribute to establishing some of the conditions in which teaching and learning occur and fulfill specific functions according to the way they are used. In Brazil, specifically in the case of Natural Science, different resources and didactic materials are suggested in the National Curricular Guidelines (PCNs) and also in the guidelines elaborated by the authors of the textbooks included in the National Textbook Program (PNLD). However, despite the importance attributed to teaching materials, there are gaps in researches regarding teachers' and students' opinions about the resources used and their meaning in the teaching and learning of Natural Science. This exploratory study was carried out with three teachers who teach the final grades of Elementary School, in schools located in the Metropolitan Region of Curitiba (Paraná, Brazil), with the intent to evaluate the adequacy and effectiveness of the instrument for the main study. The results of the exploratory study showed that the instrument was insufficient to identify the resources available at schools and used by teachers in their practices; the formulation of some questions wasn't suitable to allow the identification of resources available out of the school, such as the natural and environmental resources, which is one of the objectives of the research. The exploratory study also highlighted that the teachers mentioned textbooks as the main resource used with other materials in a complementary way, suggesting the necessity to include specific questions about this resource in the instrument.

Introduction

The teaching materials are admittedly important in the teaching process, fulfilling different and numerous specific roles depending on how they are selected and included by teachers in their classes. They are often

pointed out as a mere helper or motivating resource, but they are also understood as an element that can intentionally and intensely interfere with the teacher/knowledge/student relationship, affecting lesson planning, interactions between teacher and students, classroom and student organization in class, among other elements.

On the other hand, didactic materials are fundamental elements for learning, both for the possibility of offering students a diversity of cognitive stimuli, and for the expansion of opportunities to be in contact with different languages and supports. From printed texts to videos, films and electronic games, the presence of resources is also associated with the most active and collaborative forms of learning, for students at any level of schooling. The importance and advantages of using resources for students with special needs are also recognized.

Despite this consensus, the theme has been little investigated in the last decades in academic research in Brazil and it has gradually been receiving more attention in recent years, partly due to the growing interest in understanding the presence and effects of educational technologies in schools and also due to the recent development of possibilities of production and use of digital resources.

In regard to the teaching of Natural Science, the National Curricular Guidelines (Parâmetros Curriculares Nacionais, 1998, p. 27) emphasize a more active way of teaching, in which investigative methodologies and didactic resources stand out. The document states that "(...) different active methods, with the use of observations, experimentation, games, different textual sources to obtain and compare information, for instance, awaken the interest of students for the contents and confer senses to nature and science that are not possible when studying Natural Science only in a textbook".

In recent decades, the teaching of Natural Science has stood out in researches, emphasizing the need to approach the use of didactic materials more deeply. But there are still few studies carried out to approach the school space and school subjects, aiming to investigate how didactic resources are present in classes. This exploratory study was carried out with three teachers who teach the final grades of Elementary School, in schools located in the Metropolitan Region of Curitiba, with the intent to explore the empirical field conditions and to evaluate the adequacy and effectiveness of the instrument for the main study.

Contextualizing the research problem

The textbook is still recognized as the most widely used material in the classroom, and it is considered a mediation resource in the construction of knowledge. However, other didactic materials contribute to the students' learning, stimulating them and bringing them closer to the contents, giving pedagogical support to the teacher's work. Despite their indisputable importance and the fact that they are frequently

referred to in publications aimed at teachers, teaching materials are still little explored in academic literature.

For Moreira (2011, p. 229) "the use of diverse, carefully selected materials, rather than the 'centralization' in textbooks is also a facilitating principle of meaningful critical learning". Therefore, in addition to stimulating and motivating teaching, the author attributes roles to the materials related to the type of knowledge that can result from their use, in this case, the one that goes beyond simple reproduction, enabling the assignment of meanings and critical analysis.

In a similar approach, Garcia (2011, s/p) highlights the role of didactic materials: "as artifacts incorporated into school work, didactic materials contribute to establish some of the conditions in which teaching and learning take place and, in this sense, they have great importance and can fulfill specific functions, depending on their characteristics and the ways in which they participate in class production".

Broadening the issue and focusing especially on Natural Science, Bizzo (2009) highlights that there is a wide range of materials available to the teachers, which contribute to improving their work. In this context, didactic materials can help and mediate the development of different activities in the classroom, sharpening the curiosity of the students, attracting their attention. For this, their uses need to be planned and developed in advance, meeting the real demand of students and making a bridge with the curricular elements.

For Delizoicov, Angotti & Pernambuco (2002), the greater the possibility of access to various materials, the greater the chances of finding the most appropriate ones, assuming the responsibility of choice, necessary adaptation and the creation of new alternatives, through texts, experiences, videos, scientific journals, among others. For this to happen, it is necessary for the didactic materials to be used in accordance with what will be or has already been studied, and that there is a critical planning on the part of the teacher in order to use these materials to achieve the objectives.

Focusing on the issue of learning, Bueno& Franzolin (2017, p. 2) emphasize that teaching materials "can assist and mediate the development of different activities in the classroom". In this sense, teaching materials favor the learning, providing means to motivate students and involve them in the content that is being worked on, providing better understanding.

For Krasilchik (2008), didactic materials help particularly in investigative activities, allowing more active and meaningful options for the process of teaching and learning. Many teaching materials are routine tools in the teachers' lives, and should be valued as aids to both the teacher and students.

Therefore, the literature on the subject shows there is a consensus on the value and importance of teaching materials, for different reasons. There is a point still to be highlighted, referred by Garcia in an interview to the Teacher's Portal: "The question is, therefore, to insert the debate of this theme in a

broader set of conditions that define the spaces where teaching takes place, either at school or in the classroom". It also highlights the fundamental role of teachers as subjects responsible for the planning and development of classes and, therefore, for choosing the most appropriate materials in each situation" (Garcia, 2011, s/p).

The author draws attention to the fact that "each content to be taught and learned requires a specific type of material that can effectively establish favorable conditions for teaching and learning. (Garcia, 2011). She also recalls that some resources can be used in any school subject, but that there are specificities in each one of them and, thus, it is not possible to address this topic only in a general context.

In Brazil, in the case of Natural Science, different resources and didactic materials are suggested in the National Curricular Guidelines (PCNs, 1998). This theme is included in the guidelines elaborated by the National Textbook Program (PNLD) to support textbook publishers and authors. A volume aimed to teachers is also found in the Textbook Guide, carrying information on the approved textbooks, the criteria used in the evaluation process and considerations about the teaching of Natural Science.

The Textbook Guide emphasizes that: "In contemporary life, the textbook competes with other media. Science appears in television programs, films, cartoons, newsletters, videos shared on the web, blogs, podcasts and websites. (Guia, 2016, p. 14). After arguing in favor of more inventive ways of teaching, it points out the importance of didactic resources suggested in the textbook as complementary, such as "cartoons, comic strips, less formal scientific publications, suggestions of science fiction and adventure films, and the construction of models (...) playful activities" to stop being "marginal ways in which students learn Science escaping the excess of formalities and requirements" and become "protagonists" in Science classes (Guia, 201, p. 20).

Despite the importance attributed to didactic resources, there are gaps in researches regarding teachers' and students' opinions about the resources used and their meaning in the teaching and learning of Natural Science. Thus, the aim in this exploratory study is to test the possibility to develop a research project on this theme and to contribute to its comprehension.

Methodological procedures

This exploratory study was carried out with three teachers who teach the final grades of Elementary School, in urban and rural schools located in the Metropolitan Region of Curitiba, with the intent to explore the empirical field conditions and to evaluate the adequacy and effectiveness of the instrument for the main study.

The teachers have a specific degree to teach Natural Science and have dedicated different lengths of time to their professional carrier. The participants agreed to collaborate on this exploratory phase, and they

previously claimed they used to include resources in their Natural Science classes. Therefore, the group was considered able to test the instruments and also to contribute to confirming the relevance of the project.

The data were produced through a questionnaire with open-ended and closed-ended questions to identify resources and didactic materials used by teachers and their meanings in the teaching and learning of Natural Science. To this end, the instrument was designed with questions that addressed: the concept of the teaching material; teaching materials used in the classroom; relationships between the textbook and the choice of resources to be used in the classroom; and the students' interest in teaching materials. Selected results are described below.

Results: didactic materials available and their roles

The answers given by the teachers conceptualized the materials as supporting materials for teaching, pedagogical tools and facilitators of teaching and learning. These concepts focused both on the teacher's work and on the student's activities in their learning process.

However, the open-ended responses showed a tendency to restrict the concept to classroom practices: they are "*materials which give support to the teachers' practices in the classroom*" (Teacher A); *which serve as pedagogical tools, aiming to facilitate students' learning*" (Teacher B); and "*resources which I can use in my class to facilitate my practices and the students' learning*". (Teacher C).

This result was confirmed by the answers to other questions, as it is seen in the following sections.

Didactic materials available and the most used in classes

It was possible to identify a diversity of resources used in class – different media and languages, printed and digital. Models, globes, videos, cell phones and notebooks were cited, as well as a strategy for representing the student's thinking processes, i.e. conceptual maps. They were also understood as didactic materials.

Table 1: Didactic materials available and the most used in class by teachers

	Didactic materials available	Material most used
Teacher A	Textbook, chalkboard, computer, dictionary, globe, maps, conceptual maps, geographical atlas, games, models	Textbook
Teacher B	Comics, Textbook, posters, CDs, videos, photocopied material, internet, computer, mobile phone	Textbook, models, comic books, photocopied material
Teacher C	Notebook, chalkboard, textbook, TV, video, photocopied material, posters, models, texts	Textbook, some models, texts, videos

Source: Authors research (2019)

It has been confirmed that the textbook is the most used resource in class. The expression used by one of them is indicative of the strong relationship with this resource: "*The material most used by me is the textbook, no doubt*". (Teacher A, our emphasis)

For Megid & Fracalanza (2003, p. 40) the textbook is defined in school practice as a material for consultation and pedagogical support similar to other books and teaching materials. In the Brazilian case, it is essential to understand the textbook as a reference point for teaching, as a resource (and certainly not the only one), as a facilitator of the process of teaching and learning and as a general guide that helps the selection and organization of objectives and content.

Didactic materials available out of the school

Teachers' responses have revealed two ways of understanding the question asked regarding resources that are available outside the school. One of the teachers mentioned the presence of resources in the students' homes, among them the computer, the television and the textbook, highlighting the latter, and relating them to homework assignments: *"At home, I believe the internet is the most used resource, followed by the TV. Books, I believe that only the textbook is present at home, as a material that helps with homework."* (Teacher B)

In another direction, the second interpretation of the question directed teachers to the existence of natural resources in the communities, especially those that are more distant from urban areas. In this case, the emphasis was on the reality of farming families and the elements that make up the landscape.

> *"I believe that field classes are great resources. Many students live in the countryside and are in contact with nature, plantations, which allows us to put into practice the learning of the classroom". (*Teacher A)

*"I think the most used are natural resources. Many students live in the rural area. They live in the reality of parents who are farmers and end up teaching this skill to their children." (*Teacher C).

The possibility of using these resources, and the strategy of field classes was pointed out as a possible alternative.

The role of the Textbook and its relation to other resources

In the teachers' response, the role of the textbook as a material that organizes the work in class was explicit. The explanation regarding the presence of the textbooks in class was given by Teacher C: "*The textbook is the most used material in Brazilian public schools. We have the PNLD program, which distributes textbooks free of charge to millions of students throughout the country*". In fact, the existence of this program for about three decades is one of the factors that contributed to the valorization of textbooks in many schools, especially in low-income communities.

The importance of textbooks has also been related to student learning: *"It is accessible and free, the textbook is present in most home, contributing to parents helping their children with their homework".* (Teacher B); *"many students do not have other resources at home having the textbook they receive every beginning of the year as their only support."* (Teacher C).

On the use of textbooks in class, one of the teachers implied their role in saving time: "In the classroom, the textbook reduces the time of board use, keeping the student from copying". (Teacher A). This answer was relevant in the exploratory study because it showed the need to expand the issues related to this resource, which was not foreseen at the beginning. It also showed that its intense use in classes may be an indication that other types of resources would be used less frequently, even if they were mentioned by teachers.

Finally, one of the questions asked to teachers was to identify the role of the textbook in the choice of other resources to be used in the classroom. The teachers pointed out different ways in which the books suggest other resources, as shown below:

"As the textbook is accessible to all students, at first I use the textbook. Based on the content covered, I plan the best material to be used in the classroom (...) as a way to complement the student's learning". (Teacher A)

"Various contents (...) can be used with other teaching materials. The textbook brings many experiences and suggestions of activities to complement the teaching-learning [process]". (Teacher B)

"The textbook is the first step (...). Based on the textbook, I select the best contents to be used with other teaching materials". (Teacher C)

These answers were relevant to confirm the possibility and adequacy of the development of the main project, since the interest is in the materials for teaching Science that circulate in the schools of a given municipality, in addition to the textbook.

Didactic materials available at schools and students' interest

Among the issues pointed out by other researches (Theodoro et al., 2015), the use of classroom resources in the teaching of Natural Science is closely related to the existing conditions in the school. Some limitations and difficulties were mentioned by the participants: *"Most of the teaching materials are built together with the students. But we lack a computer lab, which makes some lesson plans impossible."* (Teacher A); *"We don't have a room where we can store didactic materials"* (Teacher B).

Despite the challenges pointed out, which are common to many Brazilian public schools, the teachers mentioned that the resources contribute to the students' greater interest in the classes, saying that: *"The students are always asking about the next homework assignment. They have already gotten used to different kinds of assignments"*. (Teacher A); *"The classes become different, bringing new features and different methodologies"* (Teacher B); and *"The students look forward to what they will do in class"*. (Teacher C).

Therefore, the exploratory study confirmed that the schools of this municipality can be a suitable research field on the theme of didactic resources used in Natural Science classes.

Conclusions

The analysis of the answers pointed out that a part of the questions used in the exploratory study is appropriate to the aims of the research, while some of them need to be reformulated or adjusted because they did not contribute to collect the expected information. The results showed that the instrument was insufficient to identify the resources available at schools and used by teachers in their practices; the formulation of some questions was not suitable to allow the identification of resources available out of the school, such as the natural and environmental resources, which was one of the aims of the main research.

Regarding the meaning of didactic materials in teaching, the answers presented generic notions, describing the materials as a support used in the teaching and learning processes; therefore, it is necessary to change the questions, aiming to obtain in-depth information on the role of materials in the didactic action. On the other hand, the exploratory study highlighted that the teachers mentioned the textbooks

as the main resource, used with other materials in a complementary way, suggesting the necessity to include specific questions about this resource in the research instrument.

Overall, the relevance of the project to be developed in the municipality was confirmed, although the study evidenced that it is necessary to structure new research instruments and to broaden the research strategies with observation and interviews aiming to understand the reality of schools and the practices using different resources.

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Processes of production, selection and use of teaching resources in literacy classes in rural areas

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Abstract

This paper presents partial results of a research whose objective is to know the processes of production, selection and use of didactic resources in literacy classes of schools located in rural areas, in Agrarian Reform settlements in southern Brazil. The research was structured in order to identify the types of didactic resources used, to know the processes of local production of materials, the ways they are selected and produced, the sources of consultation used and the pedagogical conceptions that guide the teachers' choices, seeking to record their opinion regarding the materials and the processes of production and use; textbooks is included as materials, since the government invests a large amount of resources in textbook distribution to Brazilian public schools. Understanding school in the perspective of social construction, the research uses an ethnographic approach and produces data through fieldwork strategies such as participant observation, questionnaires, interviews, documentary analysis, among others. As a result of the exploratory stage of the research, we present the data resulting from a survey carried out to identify didactic resources used to teach reading and writing through the application of the instrument to seven teachers of literacy classes at two rural schools participating in the research. The next stage of the project will include observing classes from one teacher, twice a week, to analyze the use of instructional materials.

Introduction

The text presents part of the research results that are being carried out in Schools in the Countryside, located in an area of Agrarian Reform Settlements. The objective is to analyze the teaching resources used by teachers in literacy classes. There is a specific interest in understanding the knowledge produced with the students, checking whether elements related to the constitution of the settlements and the culture and education of the communities are present in this process.

Previous research (Borowicc, 2016) has found that some literacy teachers in schools participating in the research make little use of the Literacy Teaching Books until the 3rd grade of Elementary School, in this case specifically the 2016 PNLD Countryside textbooks (PNLD Campo 2016). It was also observed, initially, that teachers daily select and produce other resources and didactic materials to use in their classes with different purposes and from different sources. Based on these results, the problem of a new research project was proposed, whose initial stage is presented in this text.

Database searches have shown gaps in research on the daily production of resources and teaching materials by literacy teachers in countryside schools for use in the classroom. Thus, the initial questions that directed the research were formulated: What teaching materials are used for literacy? Where do teachers look for these materials, from what sources? What pedagogical concepts support their choices? The textbooks for these schools located in rural areas are purchased by the National Textbook Program Countryside (PNLD Campo), which uses a large amount of public financial resources to provide this material to the schools. As noted in the previous research (Borowicc, 2016) the infrequent use of textbooks in literacy classes also raises the question of what kind of teaching materials teachers think should be produced for literacy classes that would be more suitable for their work than textbooks.

The work is being carried out in two schools that offer primary education (from 1st to 9th grades) and early childhood education (for children aged 4 and 5). They are located in a specific territory, which was constituted through land struggles, especially by the Movement of Landless Rural Workers - MST, in the 1980s-1990s, in the municipality of Abelardo Luz, Santa Catarina, southern Brazil.

This particular reality of struggle for rights such as land and education has produced in this territory and in local schools characteristics different from those of other Brazilian schools and rural areas. In the schools under study, educational proposals are developed, guided by the MST Education Project, associated with the ideas produced by the movement, nationally known as "Countryside Education", from the 1990s onwards.

Theoretical framework

The need for a differentiated education for the people of the countryside and for the working class has been associated with the struggle for land since the origin of the Social Movement of Landless Workers (MST). Thus, the movement sought to build an education that was identified as "different" (MST, 2005) in the settlements spaces. It was conceived by its protagonists, based upon the theory of Paulo Freire and the Socialist Pedagogy that had been produced in the Soviet Union, during the period of the revolution. In the last decades, articulated to the movement of struggle for land, the movement of "Countryside Education" has grown in the Brazil. It proposes the full formation of the human being, according to the

needs of knowledge of the working class, with the objective of forming critical, creative subjects, capable of fighting against the processes of oppression and being builders of their living spaces (Caldart, 2012). The proposed perspective of education, of progressive conception, is opposed to the liberal thinking that characterizes the Brazilian government at this time and, therefore, has been facing pressure from conservative rulers, both at the local level, in the municipalities, and at the state level.

Particularizing the case under study, during the period of genesis of the schools in the encampments and settlements of the municipality of Abelardo Luz (SC), empirical field where the research is being developed, there was the concern to "build the Countryside School", as stated by one of the teachers. Although it was financed and managed in part by the municipal government, the teachers who worked in several smaller, multi-series schools, from 1st to 4th grades, organized themselves to plan the pedagogical work. They were concerned to make knowledge meaningful and to give students the necessary conditions to overcome difficulties in those areas of struggle and resistance.

For Molina (2014, pp. 26-28), there are some fundamental characteristics that need to be taken into consideration for the construction of the Countryside School, which correspond to elements mentioned by the teacher in the research. They are:

a) The link with the reality itself, for the transformation of the school and of the reality, in order to guarantee teaching and learning processes linked to the social context in which the school is inserted.
b) The option to assume the work as an educational principle. This means building a school that is clear about the contradictions of capitalism and that brings into it the debate about the differences in labor in the model of the agribusiness agriculture and the peasant agriculture.
c) Guaranteeing the protagonism of peasant within their teaching-learning process.
d) The self-organization of students understood as a process of democratization of the management spaces and the execution of pedagogical practices in the school;
e) Incorporation and valorization in the school of the peasants' knowledge.

Understanding the countryside school based on these elements, the topic of teaching resources becomes relevant for two reasons. On the one hand, it is pointed out that Brazilian public schools choose and receive textbooks free of charge through the National Textbook Program - PNLD, which means a volume of public resources invested, but research has shown that there are different ways of using the textbook and, in some cases, there is underutilization of the PNLD Textbooks in the literacy stage.

The PNLD is a program of purchase and distribution of textbooks to Brazilian public schools, which started in 1985. The areas/disciplines of the school curriculum were gradually included, and the distribution was organized in stages: Early Childhood Education (started in 2019, only for teachers); Elementary School, grades 1 to 5 (children aged 6 to 10); Elementary School, grades 6 to 9 (children/adolescents aged 11 to 14); and High School, grades 1 to 3 (teenagers aged 15 to 17).

On the other hand, starting in 2011, with Resolution n. 40 of July 26, 2011, the Federal Government created a new program - PNLD Campo - for the acquisition and distribution of books specially made for schools in the countryside. Molina (2014, p. 29) points out that the Countryside Education proposed the production of specific materials because textbooks are fundamental in the construction of a certain world vision. Thus, advocating for a differentiated school for students who live in the countryside, the value of differentiated materials, more appropriate to the reality of these students, was emphasized.

However, the PNLD Campo generated differentiated situations in the production, evaluation and choice of Textbooks, and its results produced new questions, problems and intense debates, analyzed in previous research entitled "Processes for Choosing Textbooks in Settlement Schools: Dialogues and Tensions" (Borowicc, 2016). Among them are the reduction of autonomy spaces for schools and teachers; problems in the production of textbooks, especially summarized contents, which affected the use of textbooks in class; distance from the pedagogical conception of Countryside Education; the presence of stereotypes in relation to the population, life and work in the field, as well as to indigenous peoples.

On the other hand, it can be seen from the research carried out that the various educational proposals that circulate in the same school influence the processes of choice and use of textbooks. In this case, the teachers need to organize their work taking into consideration the curricular proposal of the Municipal Education System, the guidelines of the Program for Literacy at the Right Age (PNAIC), coordinated by the Federal Government; and also a third proposal constituted by the guidelines of the MST Education Sector.

This particular situation creates some problems in relation to the production and use of teaching resources by teachers in literacy classes, taking the data from previous research as a starting point, which show little use of the textbook and an appreciation of other resources.

Methodological procedures

The research aims to analyze the processes of production, selection and use of teaching resources in literacy classes at schools located in rural areas, in agrarian reform settlements in southern Brazil. The empirical work was organized to:

a) identify literacy teaching materials used in Settlement schools;

b) verify consultation sources used by teachers to prepare teaching materials;

c) analyze the pedagogical conceptions that support their choices and the materials used;

d) know the teachers' opinions about the type of textbook that would best meet children's literacy needs in the settlement schools.

The research seeks to observe two rural schools in their daily life (Heller, 1992), understanding them as a "social construction", a concept supported by Rockwell and Ezpeleta (2007). In this perspective, besides analyzing the norms that organize the institutional life of the school, it seeks to know its historicity and the ways in which school subjects make the school exist, on a daily basis, appropriating the norms and regulations, accepting them, but also resisting them and, finally, transforming it by means of their actions. The ethnographic approach is used in this research, based on Rockwell (2009) and Garcia (2001). The empirical work comprises the following strategies, among others: participant observation in school and in literacy classes, registered in a field diary; questionnaires and interviews with collaborators (with literacy teachers); documentary analysis (plans, programs, curriculum guidelines, textbooks and other teaching materials).

The two selected schools are located in an area of agrarian reform settlement which together serve approximately 600 students organized in classrooms according to each grade. There are 14 school classes in the School A and 12 in the School B offering the pedagogical work since the early childhood education until the 9th grade. The high school is only available to the students of the settlement in another school.

In the first stage, an exploratory study was developed, with the following procedures:

- School visitation for initial contact, research authorization and identification of collaborators;

- Application of an instrument to identify which teaching resources teachers were using and define teachers and classes that would apply for an ethnographic study;

- Observation and participation in the selection process of the 2019 PNLD Textbooks (Guia, 2018)

- Interview with 7 literacy teachers from the first three grades of Elementary School from two schools, applying an instrument to record the teaching resources produced or selected by the teachers for each subject / area and their frequency of use.

During the fieldwork it was also possible to analyze preliminarily the school's literacy textbooks available, chosen at the 2016 PNLD Campo (Guia, 2015).

The PNLD textbooks and the didactic resources used in literacy classes

Based on the exploratory study and with the elements obtained in the continuity of the research so far, it is possible to present some results in relation to what was proposed as the objectives of this initial phase of the project. They will be presented in three sections: a) The use of the textbooks of the 2016 PNLD Countryside; b) The processes for choosing the textbooks of the 2019 PNLD; c) The teaching resources used by teachers in literacy classes.

a) Regarding the 2016 PNLD textbooks:

It was possible to identify, preliminarily, that the PNLD Countryside Textbooks are, in general, poorly used by literacy teachers. The reason given by the teachers is related to dissatisfaction with their contents, which they consider insufficient and inadequate for their students. Some teachers report using the whole textbook, however they need to produce a lot of extra teaching material due to insufficient content.

Previous researches, such as Vieira (2013) and Borowicc (2016), analyzed characteristics of the PNLD Countryside textbooks, produced specifically for schools in the countryside and the results coincide with the teachers' opinion. In these materials, stereotypes regarding the life and work of the rural and indigenous peoples remain present. For example, one of the books analyzed by Vieira (2018) presents an activity entitled "Work in the city". Texts and images relate professions such as dentist, engineer, teacher and nurse to activities that are carried out in the "big cities", in the urban environment. The activity disregards that the countryside, the rural environment, is also a place for the exercise of these professions. People who live in the countryside can also exercise these professions and certainly some people already do.

The teachers state that there is a lack of content, because the "textbooks are very summarized" (Borowicc, 2016, p. 128). Another criticism presented by teachers on the textbooks produced to the rural schools is concerned with the teaching and learning contents. Some of the textbooks were produced as an "interdisciplinary model": three or four subjects composing one unique volume. In consequence, the contents were reduced in comparison with the "disciplinary model" used at the urban schools. The teachers state that there is a lack of content, because the "textbooks are too much summarized".

After presenting the characteristics of a Countryside School and the textbooks for the construction of knowledge in these schools, Molina (2014, p.30) states that it is necessary to face the issue of authorship of the textbooks, which continue to be produced exclusively by commercial publishers who treat them only as merchandise. For the author, a way to overcome the problems of textbooks for schools in rural areas would be their production made by the very subjects of the Country Education, a basic principle of their conception - position previously affirmed by Vieira (2013).

In 2019, no specific notice was opened for the PNLD Countryside, which interrupted the process of producing specific textbooks for the schools in the countryside. The textbook policies changed in 2017, after the impeachment of the President Dilma Rousseff (from Workers Party). This decision was made by the Ministry of Education without the participation of the Countryside Education movements, an action that most likely stems from the conservative political conceptions that characterize the Brazilian Government after the 2018 election.

b) Regarding the selection process of the 2019 PNLD textbooks

In the last quarter of 2018, there was the textbook selection process for the following period, by teachers in schools. This process was accompanied by one of the researchers. The observations showed that all teachers in the school system participated in some way in the textbook selection. However, one exception was registered: the teacher of an isolated multi-grade school was not invited to participate. It is necessary to explain that in this particular situation only one teacher is responsible to teach children from 1st up to 5th grades study in the same classroom, at the same time. Maybe the non-participation is a consequence of the distance between the isolated school and the urban center; or problems in the official communication between the educational administration and the school.

Some aspects of the textbook selection process were relevant, for example the fact that some collections of books produced by publishers did not reach all schools in the municipal network and, therefore, were not available for consultation by teachers, only via the Internet. Most teachers prefer book handling over internet consultation; only two schools (among seven schools participants) have consulted with digital textbooks. Some schools received a small number of publishers' collections to analyze, and in which case the possibilities of choice were extremely limited.

After the schools' selection, there was a meeting with representatives of each school to define a single collection in 1st and 2nd options for the municipal school system At the meeting, there was a strong debate among teachers regarding the contents of the textbooks, showing concern to choosing books that had more content, which resulted in teachers choosing disciplinary collections over interdisciplinary collections. As we explained the interdisciplinary books were considered as with reduced content ones and were not chosen by teachers in the municipality.

c) Regarding the resources and materials used by the teachers in the classes:

A survey found that there is a diversity of resources and teaching materials used daily in the school in addition to the PNLD Textbooks. Such resources are selected and/ or produced by the teachers in the

school environment. There are no specific financial resources for the production of these teaching resources and materials, which depend on the efforts of schools and teachers.

The empirical study found that there is a diversity of resources and teaching materials used daily in the school in addition to the PNLD Textbooks. Such resources are selected and/ or produced by the teachers in the school environment. It is relevant to say that there are no specific financial resources for the production of these teaching resources and materials, which depend on the efforts of schools and teachers.

For this reason, the importance of public investments in textbook distribution programs should be recognized in Brazil, as a way to minimize the effects of social inequality particularly in the Brazilian rural areas. However, it is understood that in addition to the production of adequate textbooks, specific financial resources should be sent directly to schools for the production of complementary materials for teachers' use in class. The need for such resources is justified by the presentation of the resources that are used by teachers in the literacy classes of the two schools participating in the exploratory study.

Table 1. Teaching resources and materials cited by teachers

TABLE OF TEACHING RESOURCES AND MATERIALS CITED BY TEACHERS		
MORE USED	**LITTLE USED**	**RARELY USED**
Textbooks	Reading Sheets	Photos
Children's Literature	Maps and globes	Recycling material
Copy of activities from old textbooks	Videos, movies and documentaries	Magazines and newspapers
Internet teaching sequences	Educational games and toys produced at school	Objects and materials available in the community
Book copies and adaptations of internet activities	Purchased toys and sporting goods	Immaterial culture (wheel songs, legends and myths of popular knowledge), stories told.
Purchased educational games	Audio of Children's Songs and Wheel Songs	

Alphabet, syllable, numbers and words posters	Internet content and game search	
Activities produced by the teachers on the board		

Source: Authors' research, 2019.

In the survey, textbooks appear as one of the most used materials, demonstrating that they continue to be useful for the teachers' work; however, along with them, a diversity of others resources and didactic materials were registered. They were selected and produced by the teachers, although certainly with many difficulties because there are no specific resources, which should be the object of attention in the continuity of the research.

Final Considerations

The intention of the research was to make a first ethnographic approach with schools located in rural areas, with the objective of knowing the didactic resources that are produced and used in literacy classes. At this stage, it was possible to see that textbooks remain one of the most used resources by teachers, but alongside many others, which reaffirmed the relevance of the research topic and the possibility of continuing the empirical work. Preliminarily, it was possible to identify difficulties faced by teachers in accessing other resources, which should be the subject of interviews in the next stage of the project.

In addition, other elements should be considered in the continuity of the research: a) Observations of classes of two teachers in order to analyze the teaching resources and materials used in the classes, and to find the sources of the materials used. b) Identify the pedagogical conceptions that support the choices made by the teachers. c) Analyses to understand the relationship between the teaching resources and materials applied with the different proposals used by the schools - the Education Project of the Landless Rural Workers Movement - MST, the Pedagogical Proposals of the School and the guidance given by the municipal school system.

It is necessary to point out that textbooks produced especially for schools in rural areas have been considered inadequate by teachers, either because they do not contemplate the reality of life and work in these areas, or because of the simplified way in which the textbooks present the knowledge of different school subjects. The interdisciplinary presentation of books was also evaluated as inadequate by the participants, who prefer to have one textbook to work on each of the curricular subjects.

Observations in literacy classes will open new possibilities of analysis, broadening the understanding of the processes that occur in school daily life, as a result of the school's social construction processes.

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Analysis of the characteristics of digital didactic materials used and elaborated by teachers. Case study of two primary schools in Galicia (Spain)

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Abstract

This paper presents the main features and partial findings of a research project titled *Schools in the Digital Society: Analysis and proposals for the development and use of digital educational content - Escuel@ Digit@l* (EDU2015-64593_R) which is part of the Spanish National Research, Development and Innovation (R+D+i) Programme Aimed at the Challenges of Society. Several research teams and independent researchers from five Spanish universities (University of La Laguna, University of Las Palmas de Gran Canaria, University of Valencia, University of Santiago de Compostela and University of A Coruña) have participated in this project. These teams have extensive experience in this line of research, as reflected by their participation in other R & D projects and their academic publications. The project is also been possible thanks to the collaboration by companies in the sector, as well as international associations and researchers.

This research project aims to analyse the current state of the production, distribution and educational use in the classroom of digital educational content or online instructional materials for primary education in a sample of three regions of Spain (Canary Islands, Galicia and Valencia). The purpose of the research project is to explore what digital didactic materials are offered to elementary schools in Spain, what are the underlying educational models supporting them, what differences exist between commercial and institutional platforms, what visions are held by the different stakeholders on educational digital resources, what impact these resources have in the classroom, how they are used and, finally, what recommendations may be made to the agents involved in producing and using educational resources.

A first approach to the study, focusing on its objectives, methodology and initial results, was presented by Professors Pablo Joel Santana and Jesús Rodríguez at the 14th IARTEM Conference held in Lisbon, as part of the round table "New media, new ways of learning?" (Santana Bonilla, & Rodríguez Rodríguez, 2019) which addressed the discussion on whether the coexistence of printed and digital media can contribute to potential new teaching and learning methodologies or only increase the number of available resources without fundamental changes in educational practices.

In this paper we undertake Study 3 of the main research project. This part of the project focuses on analysing the characteristics of the digital didactic materials elaborated and used by the teachers, and the results obtained in two of the seven case studies, specifically at the schools located in Galicia. As a summary of the findings, the digital materials elaborated by the teachers have led to improvements in specific aspects involving the integration of technology to simplify the reading of documents and enable the adaptation of certain educational materials. However, deficiencies also found by previous research were highlighted, such as materials not being as suitable as they could for students with visual, sensory, or motor difficulties (even though the technology offers a lot of potential to be able to accommodate these special needs), the lack of activity proposals to foster student interaction and the lack of diverse sources of information for classroom work.

The problem, hypothesis and aims of the project

The ubiquity of digital technology in its many formats (tablets, smartphones, multimedia devices, laptops, etc...) has not only penetrated the most productive, economic and service sectors in our society, but has also altered the ways of producing, distributing and consuming culture and knowledge. This technology is having a direct impact on traditional cultural industries that package and disseminate information (music, film, media, etc...), and has caused a crisis in the traditional model of production and access to cultural products.

Something similar is beginning to occur with traditional educational materials, such as textbooks, whose near monopoly in the classroom is being challenged and replaced by other technological resources such as interactive whiteboards, laptops and/or tablets that require the use of digital materials. This project, therefore, aims to explore the phenomena and processes involved in changing the business model of school textbook publishers toward one based on the distribution of contents in digital educational platforms. We also aim to analyse the impact that these new materials have on teaching and learning practices in schools and classrooms.

The initial general hypothesis for this study is the following: the transition from print-based educational materials to digital formats implies not only a reformulation of the business model of this industrial sector

and associated business parties, but also requires very profound changes on the way in which teachers teach and students learn, as digital materials make it possible for teachers to customize materials to student characteristics and, thus, open the possibility to creating more diverse technology-enhanced learning environments. In short, digital materials lead to new forms of interaction between learners and knowledge.

More specifically, the objectives of this research project are:

1. To analyse the pedagogical and technological characteristics of platforms and portals of digital content for primary education in Spain, with platforms being commercially produced by publishers while portals have an institutional nature and are managed by the regional administrations.

2. To identify the views and opinions, on the transition from textbooks to educational digital content, of the various agents and sectors involved: teachers, students, families, publishing companies and educational administrations.

3. To explore the educational use of digital content and resources in the classroom and its impact on teaching and student learning, in a sample of schools in the autonomous communities of the Canary Islands, Galicia and Valencia.

4. To develop and validate a guide of proposals and suggestions for good practices on the production, distribution and use of digital educational materials aimed at professionals and companies, public education authorities, teachers and families on the basis of the research results.

Methodology

The methodology for this research is mixed since we propose a series of different studies with different approaches. We planned four studies, one for each of the general objectives, and each study, in turn, with its own objectives, methodology and procedure (see Table 1).

Table 1. Summary of specific studies

STUDY	SPECIFIC AIMS
Study 1 Analysis of the pedagogical characteristics of a sample of commercial and institutional digital educational platforms and portals, and digital materials for Primary Education *(2016-2017)*	1.1 Design and validate an instrument for analysing digital educational content for Primary Education. 1.2 Analyse a sample of commercial educational digital content platforms as well as institutional portals created by the Education Departments of the Canary Islands, Galicia and Valencia. 1.3. Analyse a sample of digital educational resources for Primary Education (5th and 6th grades) from the selected platforms. 1.4. Conduct a comparative analysis of the digital platforms and educational resources previously studied.
Study 2 Identification of the opinions of the different agents involved in the design, dissemination and use of educational digital content *(2016-2017)*	2.1 Identify the representations that different educational parties (teachers, students and families) have regarding the didactic potential of digital content in Primary Education. 2.2 Analyse the representations that managers of institutional portals as well as of company platforms creating commercial educational content have regarding the didactic and market potential of digital content in Primary Education.
Study 3 Case studies on the use of digital educational resources in primary schools and classrooms *(2017-2018)*	Select a sample of schools in the three autonomous communities to carry out case studies on the use of digital content to develop a cross-case analysis.
Study 4 Development of a good practices guide for the production, distribution and use of digital educational resources *(2018-2019)*	Develop and publish a guide of good practices with suggestions derived from the research findings.

As we mentioned before, the third phase of research has focused on conducting case studies on the use of digital media in schools and primary education classrooms. Below we specify the methodological development of this third phase and explain how the case studies were conducted. The objectives of Study 3 were two-fold, the second one being dependent on the first:

1. To study the use and design of digital teaching materials by teachers and students in 5th and 6th grade of Primary Education from seven schools in three autonomous communities of Spain (Canary Islands, Valencia and Galicia), /which were observed during the 2017-2018 academic year.

2. To explore some aspects of the immediate context in which classroom practices take place, since it makes no sense to study what happens in these classrooms without knowing the reality of the school in which they are inserted.

Information was collected at two levels:

(a) In each school (considered as the unit of analysis), in order to be able to contextualize the use that was made of the DDMs in the classrooms.

(b) In each class selected as a study sub-unit, within each school, with the purpose of identifying organizational and didactic patterns in the use of DDM.

Specifically, this paper will focus on the specific objective of Study 3 related to analysing the characteristics of the digital didactic materials elaborated and used by the teachers, and the results obtained in two of the seven case studies, selecting the schools located in Galicia. A sample of 7 primary schools was selected, and they were monitored during a school year. At each of the schools, information on digital resources and their use in classrooms by teachers and students was collected through non-participant observation in the classroom, interviews with key informants (school administrators, ICT coordinator, families, etc.) and review of the school's documentation about its annual programming and the integration of ICTs, the digital teaching materials used and other web resources.

Briefly, the main steps followed and instruments used in the development of this part of the study to analyse the use of digital media in schools and primary education classrooms were the following:

- Drafting of a classroom observation guide. The guide sets out the guidelines to collect information about classroom organization (plan), materials and resources, methodologies and strategies, student and teacher roles, communication and interaction processes, origin of the materials, the school's administration.

- Validation of the observation guide. National and international reviewers examined the guide.

They made suggestions regarding narrative aspects and the inclusion of several items. The research team analysed the suggestions and proceeded to reformulate the guide.

- Observation in 7 classrooms during a school year, several times per month. To do this, researchers made between 5 and 6 observations in each classroom and subject using the guide.

- To analyse the results, first we categorized the information into dimensions and subsequently analysed the results. The dimensions were:

  - Use of ICTs and Digital Didactic Materials (DDM) in the school and in the classrooms: School Administration; teaching materials used; and the teachers' elaborating their own DDMs.

  - Development of the research report.

  - Forwarding of report to schools for its negotiation. School staff reviewed the report and made suggestions or asked questions about certain results. In most cases, they agreed with our reports.

  - Revision of the report if necessary

The sample selection was made based on a deliberate non-probability sampling and, for convenience purposes, considering case selection criteria other than the representativeness of the entire population. The selection of participating schools was based on three criteria:

1. Diversity of typologies. A quota or stratified sampling was not carried out, but the selection for the overall study was made with the aim of including different types of schools according to their financial nature (public, private, state-subsidized) and context (rural, urban, rural-urban ...). The case studies presented in this article respond to publicly-owned schools located in rural areas, one of them in a town near a large city (rural school, close to big city) and another in a rural setting far from large cities (rural school, far from big city).

2. The schools had to have considerable experience in the use of ICTs. These included schools that participate in the programs for the inclusion of technology funded by the regional governments, schools or teachers that have received awards for their innovative projects, or other evidence based on the judgment, experience and knowledge of the research team.

3. Accessibility. The schools were selected on the basis of how easily accessible they were to the research team and the availability shown by the school and its teaching staff to be interviewed and allow observations. The possibility of accessing the digital teaching materials used at the school was also considered.

Results

In this research we have taken into account that each type of digital teaching material and educational resource may have a diversity of concepts and definitions associated with it. For clarity purposes, we have considered five kinds of digital materials:

- Digital Object (DO). A digital media or multimedia element without an explicit educational function or a specific curricular goal. A picture of a thermometer may be used in Physics or Health Sciences, and it can be included in a conceptual map, a learning activity or an evaluation activity. This is equivalent to the first level of AENOR's Standard UNE-71361:2010.

- Digital Learning Object (DLO). A digital object produced with a short-term educational purpose that requires some action on the part of the student. Used to adopt the shape of isolated activities or exercises. This is similar to the second level of AENOR's Standard UNE-71361:2010.

- Digital Educational Resources (DER). A structured package of digital learning objects designed to facilitate the development of student experiences around a unit of knowledge or a competence. For example: a lesson, a course, a space for collaborative work to develop a project, an environment to create a PLE or student portfolios. This is equivalent to the third and fourth levels of AENOR's Standard UNE-71361:2010: Didactic Sequence and Training Programme, respectively.

- Resource for Teachers' Use (RTU). A combination of digital objects which provide teachers with ideas and resources (classroom planning, practical experiences, intervention proposals, publishing spaces as blogs or wikis) for training and professional development. This kind of digital object does not have an equivalent AENOR Standard.

- Apps, Tools and Platforms (ATP). They include software with a general purpose and software created for an educational purpose.

Some of the most relevant findings are summarized below:

Coexistence of various types of materials

Although we detected that in some cases the teachers have developed their own materials and these have attained absolute prominence in some classrooms, the most common strategy adopted has been that of the coexistence of various types of resources in the classroom. In this sense, in the classrooms analysed, the Digital Textbook (DT) has a leading role in the development of classroom sessions, but with different

uses. Students coexist with different uses of digital textbooks, but also with other DDMs and with printed or tangible teaching materials. Traditional uses coexist with others that could be more innovative.

In both schools, teachers have chosen to use the materials they developed as a complement or addendum to textbooks in classrooms. In this sense, the opinion of one of the teachers interviewed is clarifying:

> Let's see, I think it has to be a combination of everything (tangible, flashcards, books, digital materials). We cannot banish paper, it is necessary for work, concentration... I think that tangible materials, those that are paper-based, mostly serve to reinforce knowledge, to work on it. In addition, interactive teaching applications, other multimedia resources, digital learning objects... they are also useful, mostly to consolidate knowledge, and for students to do their own self-assessment. They are faster than doing the work on paper and, perhaps, they don't require as much concentration, and the students are able to see for themselves how much they are learning. It is also a very important resource to foster student motivation and creativity [...] when they create, they make their own materials through digital resources and are also more motivated (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science).

Similarities of Digital Teaching Materials and printed materials

According to the interviews carried out, we observed that in both schools there are teachers who have produced original digital materials adapted to different needs, although what they understand by Digital Teaching Materials and the characteristics these must have differ between schools. We have also noticed that some of the materials created are very similar to their printed versions, and some of them are, in fact, the same but in digital format, almost always in PDF format. In terms of pedagogical models, traditional models prevail, especially the behaviourist type: close-ended questions and encouraging students to use the trial-error strategies. This observance is similar in both, the resources designed by teachers from scratch, and the DDMs created by editorials:

> Well, currently there is little difference. There is no difference between a digital and a paper textbook, they are usually the same. What most publishers do is transform the textbook into a pdf. So the difference is not very substantial. Maybe they have added elements, such as a clarification on terminology or an interactive application, but they follow the same traditional textbook exercise model (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science).

Families, for their part, were critical with E-Dixgal (the digital education program run by the autonomous government of Galicia). They believe that the DDMs provided on the platform and used in schools do

not take full advantage of the digital potential and, especially, in relation to the type of activities that may be implemented, they question its *"lack of flexibility"*, and believe it does not foster interactivity or learning: *"It can not exactly be considered as working with technologies, it is merely the same as a test"* (Family's Voice, Galicia_Case 2_Parents Association Interview).

The perception of the teaching staff and of the families, as well as the research team's own analysis of the DDMs used in the schools, coincides with the results presented in Losada Loureiro, & Rodríguez Rodríguez (2019) and Rodríguez Rodríguez, Bruillard, & Horsley (2015).

Adaptation to the reality of each of the autonomous communities

Among the theoretical proposals, adaptation to the socio-cultural diversity of the different autonomous communities stands out. In general, Digital Textbooks (DT) offer little possibility for adapting to the reality of each classroom or getting closer to students' interests, thus neglecting the great potential that technological resources have for adaptation. In most cases, teachers prepare materials individually or collectively according to the context and goals to be achieved. They work individually whenever they are intended for use in the classroom for a specific subject. They work in teams when materials are intended for supplementary activities.

Likewise, one of the aspects with which teaching materials have to coexist is that of the contradiction that arises between the need to promote civic coexistence by promoting the values shared by all European citizens and the right to assume diverse specific cultural identities (López Facal, 2010). Through the proposals for materials developed, the teachers have been able to adapt the teaching materials to the specificities of the autonomous communities and this has allowed them to break the centralism that the textbooks normally used in the classroom tend to present. The following opinion from teachers expresses this concern:

> What's our problem? Many of the resources are made at the state level, just like textbooks. So, sometimes, they don't adapt to the context. Another problem is that when these resources began to emerge… What happened? Many times the teachers wanted to create their own materials, mostly due to personal motivation and their own desire to learn but… it is often the case that they lack certain skills, they may have very basic computer knowledge, or lack expertise on specific topics, so you have to make an assessment and see if what they produce is suitable or not (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science).

Reconstruction of pre-existing materials for reuse in different situations

Although one of the alternatives through which teachers chose to address sociocultural diversity was to prepare the materials themselves, the teachers have highlighted that one of the clear responses to the lack of contextualized materials in their reality has been the reconstruction and adaptation of existing materials. The teaching staff have highlighted that there are certain elements that at times have prevented them from preparing their own teaching materials, among which they pointed out the lack of time or not having adequate training to be able to develop them (Rodríguez Rodríguez, & Montero Mesa, 2012).

What they have done in many cases is to re-construct pre-existing materials for reuse in different situations. In this regard, teachers highlight the flexibility that digital materials offer and how they can be more easily adapted to the context and the students, helping to manage diversity in a better way, while giving a much more important and active role to the student (Galicia_Case 1_Teacher Interview 2_Subject English). Teachers emphasize the need for a professional culture to share and develop materials that facilitate adaptation: *"Digital resources would have to be adaptable so that they could be adapted to the context. You may have a basic structure and you can adapt it to the context and the characteristics of the students"* (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science). In the same school, another teacher said:

> The most significant advantage is that you can modify them to your liking, even if they have a relatively closed format to start with. Now you can have a choice of materials. Before, with the book, you came to a school and the book they had was the one you had to use, you could not change it... Now, in a way, the book is still the base, but you can adapt it, its contents, you can add to that base or you can create additional content yourself (Teacher Voice, Galicia_Case 2_Teacher Interview 2_Subject Spanish).

Integration of Technologies, Digital Teaching Materials and student motivation

In most cases, teachers, families and even students allude to the fact that using ICT resources seems especially useful for promoting student motivation towards learning. In this sense, one of the arguments shared by families, teachers, and the students themselves is the role attributed to ICTs as a resource for motivation. The attractive designs of the DDMs, making some school tasks easier, the immediacy in the responses, the connection of ICTs with the adult society, the ease of connection with the network and the affective identification with gamification are some of the explanations that justify the use of these resources. A teacher considers that their use in the classroom is important because:

We also have to remember that they live in a technological world, that they use technology for leisure, or as a relational element. So, for them it is very motivating, so I believe that both aspects must be reconciled because they are characteristic of our society and our daily life (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science).

Along the same line and in a complementary way, the school's administration department states:

Mainly a new medium, more connected to their daily reality, in which, unfortunately, books are less and less used in homes, fewer are bought... and, instead, everyone, at an certain age, has a phone, a tablet, a computer… And then, in addition to that, these devices are the source of information, instead of the textbook, they can find it there, especially with internet, they have a window to the world, an immediate connection to information that would be impossible to access any other way, real data from a company, data that has never been in a book or available to teachers and students... (Principal's Voice, Galicia_Case 2_School Management Interview)

These results are in line with those obtained in other research projects in different parts of the world. The motivation of students when using ICTs in the teaching-learning process not only affects the students themselves (Kolas, Nordseth, & Munkvold, 2016; Jagušt, Botički, & So, 2018), but also the teachers' feedback (Li, Yamaguchi, & Takada, 2018).

Digital Teaching Materials and Alternative Methodologies

The use of other types of digital didactic materials (DDM) is usually associated to open-ended methodologies (Area Moreira, 2017), which aim to provide students with more autonomy, allow them to develop their digital skills and provide them with more constructive and participatory educational experiences (Ferreira, Neves, Costa, & Teramo, 2017). In this research, in general, all teachers, explicitly or implicitly, recognize the need to implement more active methodologies, more innovative pedagogical initiatives and methodological changes that lead to a better use of ICTs in the classroom (Galicia_Case 2_Annual General Planning). Although they acknowledge their limitations and the need for training, *"teachers are also trying to train further to be able to work (around ICTs)"* (Teacher's Voice, Galicia_Case 2_Teacher Interview 3_Subject English). They admit that plenty of technological training is being offered, but they also express the difficulty when it comes to implementing pedagogies that try to maximize the possibilities offered by technology to achieve a more contextualized and adapted teaching-

learning process. The training *"is mostly focused [...] on creating materials but I feel that sometimes the pedagogical perspective is lost"* (Teacher's Voice, Galicia_Case 2_Teacher Interview 1_Subject Social Science).

In general, there is a coexistence between traditional reproductive learning models and methodologies such as project work that is quite widespread, which essentially seeks the integration of linguistic and cultural projects of STEAM subjects. All this coexists with the introduction of strategic methods such as scratch, virtual reality or Makey Makey (educational robotics based on Arduino), but also with Service-Learning.

Unfinished goals

In general, teachers acknowledge that the creation of their own materials is still a pending matter, although it is a desired goal for the school administration. Many teachers act as consumers of products created by agents from outside the school, which they sometimes adapt to the different classroom needs. One of the greatest difficulties that teachers have highlighted has been, in addition to the lack of time discussed above, the overload of bureaucratic tasks and the organization of schools: sometimes they are conditioned by coordination difficulties, as this researched has shown, with different teachers admitting that they are frequently not aware of the projects being carried out in other classrooms. There is a greater need for coordination among professionals, because many times this unawareness extends to initiatives being carried out at their own school (Braga García, & Dos Santos Schimdt, 2020).

Likewise, although many teachers have shown that they create their own materials, a review of the methodological model followed is advisable. The teachers themselves indicate the intention to improve through training and networks:

> We started with a basic knowledge of different ICT resources and with basic information on the national educational reform. It is our intention to improve the organization of the school, our coexistence, the methodological proposals and institutional cooperation to be able to adapt to the new educational needs, especially taking into account the methodological changes that the teaching field is faced with. Therefore, we intend to continue creating a space for teachers to learn about and take advantage of the possibilities of the educational reform and to achieve adequate technological competence (Galicia_Case 2_Annual General Planning).

Conclusions

The introduction of ICTs in the schools analysed is a reality. Digital materials coexist with other different types of materials. The introduction of technology has not always led to more innovative educational practices, where students have an active role in the teaching-learning process (Mato-Vázquez, & Álvarez-Seoane, 2019).

In general, ICTs could be an opportunity for socio-educational and professional enrichment, but this is not always the case. Often, teachers follow a traditional methodology and adapt digital materials created by others (publishing or technology companies, other professionals, institutions, etc.). They admit that they find it difficult to create their own materials due to three main reasons: lack of time, lack of training for producing their own high-quality digital materials and, sometimes, lack of training in the pedagogical field to be able to integrate the use of ICTs in their educational projects.

Teachers who did not create digital educational resources considered that the potential for students, families, and teachers to keep the communication flowing depends more on the teaching methodology than on the digital resources used. However, teachers who created digital resources were convinced, based on their own experience, that their use facilitates and enhances the communication with students and may even help some students overcome their shyness. These teachers also believed that digital resources enable better communication with families.

Given that there are often various skill levels within a classroom, the teachers and the families that participated in the study believe that ICTs should become an opportunity to facilitate adaptation to the different characteristics of the student body, as evidenced by different authors and research projects (Alba Pastor, 2012). But, due to the traditional pedagogical model on which materials are based and the poor use of the technological potential, in practice, adaptation to different individual and collective needs do not always occur in the classroom, although teachers consider that ICTs may contribute positively to being able to address classroom diversity.

Involvement in the development of a collaborative culture, the introduction of technological materials has not lead to a substantial improvement in collaborative work and learning, since this must be accompanied by methodological changes.

In this context, it is worth highlighting the underlying idea in the discourse of both teachers and families: the incorporation of ICTs in school is not just due to the usefulness of these tools but also to the social pressure felt by the school to include them. Teachers state that "*you end up having to do these things because the students themselves demand them, as well as society in general. […] Nowadays, the use of technologies at school receives a lot of media attention. So, it seems that if you don't use ICTs, then you are not in the real world*. (Teacher's Voice,

Galicia_Case 2_Teacher Interview 1_Subject Social Science). It is possible that many teachers feel pressured to incorporate technology in the classroom, although they do not always accept its suitability. As a summary of the findings, even if digital resources have the potential to enable a better adaptation of educational resources to the different needs within the classroom, DT and other digital resources produced by editorials had other deficiencies include the lack of activity proposals to foster student interaction and the lack of diverse sources of information for classroom work. Digital didactic materials elaborated by the teachers have led to improvements in some specific aspects involving the integration of technology to facilitate the teaching and learning process. These self-design materials are often the ones that best serve the needs of specific students (for example, students with autism, dyslexia, visual, sensory, or motor difficulties), since they were most likely designed with them in mind. However, even when teachers tailor or design from scratch these resources, their possible limited knowledge of ICTs, the inflexibility of certain platforms or portals, or other similar factors prevent them from taking full advantage of this technological potential. Overall, as several previous research projects have highlighted, the use of ICTs still has not resulted in improved accessibility to knowledge inside the classroom for students in general, whether or not they have specific educational support needs (Vidal Esteve, Vega Navarro, & López Gómez, 2019).

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Systems of resources for science teaching in high school: a French Case Study

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Abstract

The EDA laboratory at Paris Descartes University has from 2016 to 2019 been responsible for a research project supporting the development of a software resource aiming to help students understand the various stages of a research process, in several disciplines at both the primary and secondary levels. This article presents a case study about the usage of resources by teachers at grades 4 and 5 in France. Our conceptual framework of systemic analysis and thematic analysis led us to the conclusion that teachers are offered various online resources designed to support them and actually use a resource system they have themselves built in the classroom. Online resources are a part only of the resource system. The various resources are nimbly mobilized in order to facilitate the realization of the pedagogical project or to overcome problems that occur unexpectedly. The use of these resources is made possible through teamwork and teacher pedagogical expertise.

Keywords

Innovation, learning resources, Educational practice, Learning design

Context and research question

We shall present here a part of the research we performed in a research project: "Les Savanturiers du Numérique" (LSN). This project took place in a national scheme, *Les savanturiers*, a portmanteau word joining *savant* (scientist) and *avanturier* (adventurer). This scheme, which aims at developing a research attitude in students involves volontary teachers and "mentors". It has benefited from a steady interest by decision makers, both at the national and local level (Ansour, 2017).

The main idea of the project has been to develop and to test a software resource helping students to develop a research attitude for the study of scientific phenomena: "Cahier Numérique de l'élève

chercheur", CNEC – digital notebook for student-researchers (Cisel et al., 2017). The CNEC is a LMS-like environment accessible on a computer and on digital tablets having an online connection. It has been designed with different modules that can be used to support students' constructive thinking, in a participative manner.

The main research question we consider here is how teachers have mobilized different types of resources (both material and digital) at their disposal during classroom sessions. Our contribution is one among a series of papers produced by this research project (Baron & al., 2019, Barbier, 2019; Cisel & al, 2019).

Theoretical and methodological approach

We adopted a systemic approach considering instruments, actors and systems along the lines of Baron & Bruillard (1996): instruments have affordances, but also a wide range of possible usages. They are used by people who have specific values and constraints within a system that however permits them a margin of action. We also used methods and insights of a preceding research project, ANR *Révéa*, considering the ecosystem of resources used by teachers (Bruillard, 2019; Bento, Baron & Voulgre, 2015).

We shall concentrate here on a class (year 8) in Paris supervised by two teachers that we followed during 6 weeks with an ethnographical approach, and shall also mobilize observations done in another elementary class of Paris, following the same method.

We carried out a thematic analysis of exploratory data obtained during the working sessions or from research on the internet. These data are composed of notes of observations, audio and video captures as well as interviews with teachers and students.

We are conscious that the conclusions we present here suffer from limitations and must be taken with caution: we present here a fraction only of what has been achieved. However, what we found is well aligned with the general conclusions of the projet (Baron et al., 2019).

Two main categories of resources have been identified. The first one has been specifically devised for teacher training. They have been produced by the Savanturier project itself and have probably been used by teachers before their lessons, but we have no direct measurement of the extent of their actual usage. The second category concerns the resources observed in the classroom. Those resources were chosen and used by the teachers themselves, sometimes in an improvised fashion.

A resource system for teacher professional development

In order for primary teachers to teach science through an investigative approach, a series of educational resources have been developed to insure teachers' professional development. The *Savanturiers* website gathers a bank of resources with which teachers can interact (Voulgre, Roux-Goupille & Gueudet, 2018).

Savanturiers - School of Research

On the page https://les-savanturiers.cri-paris.org/, the "Savanturiers - School of Research" is presented as an "educational program, developed by the *Center for Interdisciplinary Research*, which mobilizes and federates the educational communities and scientists who co-create and innovate in the service of the School. ". The program promotes an active pedagogy and pursues three axes of development: one to develop projects in class and around, one to develop research and one to train professionals in education. According to the website, "Students are asking themselves many questions about climate change, the disappearance of glaciers, ecosystem transformations and their impact on biodiversity. These questions combine citizen concerns and fundamental scientific knowledge in construction. Moreover, the project-based approach promoted by the research school seems to be able to be used to the extent that projects in climatology are "multidisciplinary in nature".

The site offers teachers the opportunity to work with students on different issues. The main goal of the is to transform teaching practices and rename the class to "labs" and students to "apprentice-researchers". The notebook is also renamed "laboratory notebook". This change in denominations may imply a paradigm shift.

However, the objectives behind the blog discourse are adjacent to the classical scientific objectives: "Observe document", "ask yourself questions", "define a problem", "work in a team", "communicate your results and programs".

What is original in the program is the presence of a *mentor*, generally a specialized researcher. This person outside the school allows to create a dialogue throughout the work, motivates students and guarantees the steps taken in the classroom or at least who can give his opinion.

Example of a specific resource for teacher education

The following illustration presents the eight dimensions of research that are promoted by the actors of the Savanturiers program in order to train teachers in their investigation of scientific issues in the classroom.

The aim is to make students successively work on the state of the knowledge thanks to the documentary research then on the collection of the questions of the pupils, the construction of a scientific questioning, the production of a protocol of research, the research itself, the organization of the data collected, the conclusion of the research which can lead to formulating a new questioning or a restitution for which there is no formal constraint.

Resource for teachers

A resource from the Savanturiers website used in the design process
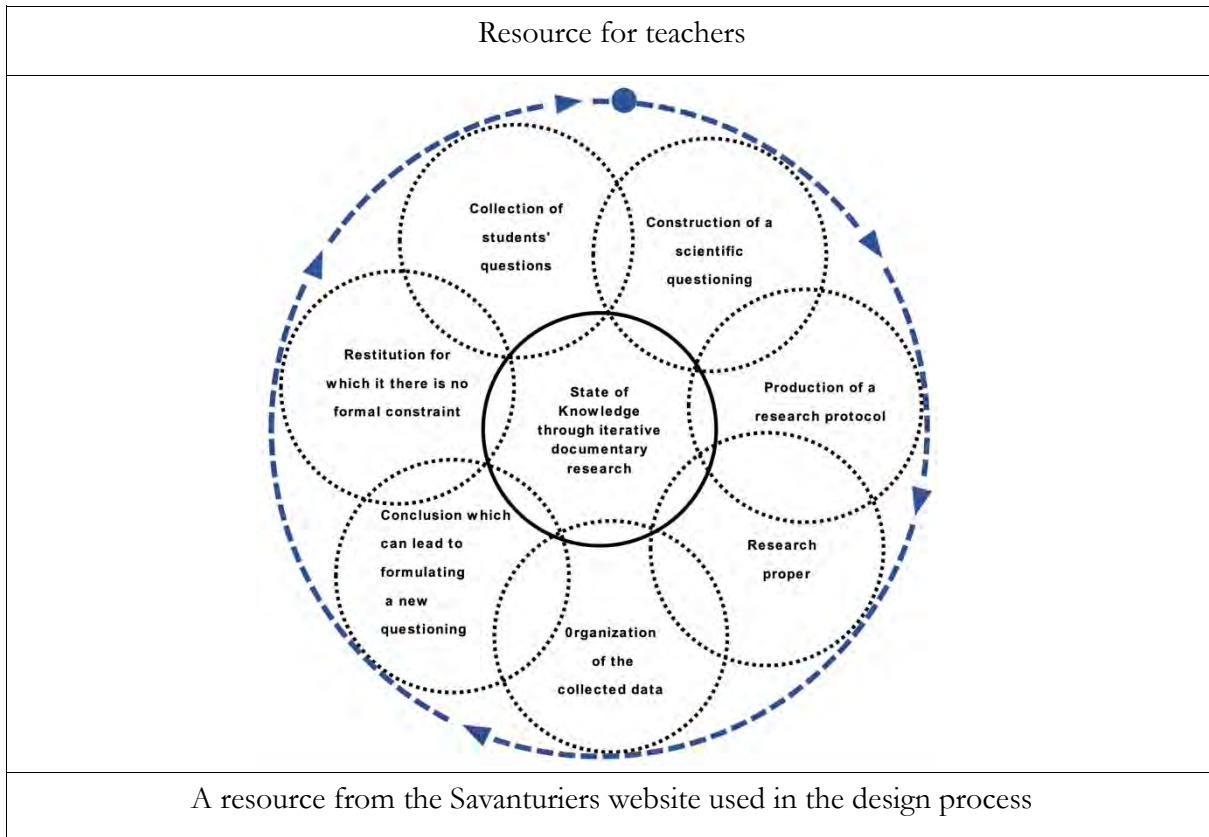
In the Classroom: Another System of Resources

Four kinds of resources were used by teachers in the classroom. First of all, as in all common classrooms, there are "environmental classroom resources" such as exercise books and pens. The "pivotal resource", central to the activity of teachers and students, is the CNEC. Third, there are some "retro actioned resources" for reactivating knowledge, built in a previous pedagogical sequence and mobilized in a new one (for example results about the reasons for the de-regulation of the climate). Last but not least, "palliative resources" are sometimes necessary for teachers to bypass obstacles such as a loss of the WiFi connection.

We have identified several practical functions for the CNEC: it has sometimes been used as a medium for writing questions, a common space to visualize and to be informed of all the questions, and a support to discuss the relevance of the questions.

Some difficulties for using the CNEC depend upon the students' progress in their understanding of the current scientific project and upon the fact that teachers have to limit the risks of losing face when using new, digital? instruments with their students.

Other difficulties are due to the current prototypical status of the CNEC, ergonomic problems have been found, in particular the identification of the functional zones of the interface…

Examples of Environmental classroom Resources

The following illustration shows resources that are accessible in the classroom.

Among these resources are the resources of major necessity that are used by teachers and students. The interactive whiteboard allows teachers to show during the session, the key stages of a science research during the collective review of the work done during previous sessions.

The furniture (chairs, tables) makes it easier for students to work in pairs and observe the activities of others. Also, we note the resources of minor necessity in the observed project such as machine tools and textbooks.

Resources of major necessity	Resources of minor necessity	Resources of minor necessity
Digital interactive board and classic furniture	Some technologic tools	School Manuels books

Pivotal Resource: the idea generator

The CNEC is offered to voluntary teachers. It offers many features that are not always easy to use.

The software called "Researcher's Digital Book" (CNEC) has a feature called "Idea Builder" (image below). It is accessible from the drop-down menus and allows to create a digital wall of ideas. Its design has been influenced by the Knowledge forum (Bereiter & Scardamalia, 2003) .

The idea generator may be exploited in many different ways: brainstorming, association exercise, follow-up task (ideas are tasks that fall into the categories that correspond to progress reports) and sharing resources (ideas contain links to online articles).

Students can add their ideas to the wall as a post-it. It is also possible to sort these ideas by categories. The teacher has a command for him or her to be visible to the machine of his students.
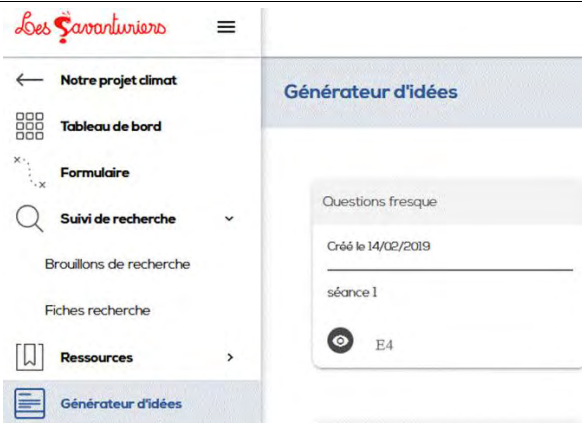
Researcher's Digital Book (CNEC)
The idea generator

Examples of retro actioned resources

The following resource is the result of co-developed work with several students.

Teachers printed maps of an environmental game found on the Internet to help students think about the systemic links between several events that can accentuate global warming. Students use the notion of concept map to reel the elements.

This work, carried out before the session observed, came to nourish and enrich the students' representations concerning the scientific theme of the session observed. The teachers therefore thought the work upstream as a support for the reflection of the course. The questioning phase on the causes of global warming should allow students to consider classroom experiments.

A collaborative work resource
Concept map

Palliative Resources

The emergency resource is a resource that teachers use when what they planned to use does not work. It is used to palliate a difficulty. The resource presented (image below) during the course observed is made available through a territorial device to give digital resources to teachers. The teachers asked the students to use software to write their ideas as in the CNEC Ideas Generator. The latter did not work well, so teachers used an application they had already tested in another class to try to continue the activity. It is the expert practice of teachers that has made it possible to bounce back.

Emergency Resources

A resource offered by the city

Discussion

We have in this paper considered the appropriation by teachers of a new instrument designed to foster a research attitude among high school students studying scientific matters. The teachers were innovators involved in a national scheme and therefore they had enough self confidence to take the risk of participating in the testing of an unfinished software system.

They had received support from the savanturier community: First, mentors occasionally went to the classrooms and students generally remembered sessions with them, because they were perceived as scientists having a high social status. Members of the Savanturiers support team also organized periodic meetings at the Savanturiers building. Last but not least, digital resources were available for teacher training. Those resources are related to scientific and methodological contents and are organized by theme on the Savanturiers website. Their functions are to enrich the knowledge of teachers if they wish.

On the other hand, teachers have also designed and used their own resources for classroom use. Some of them are activity sheets for students; diverse documents have also been created, the main function of which has been to keep track of classroom activity related to the project. Those resources both served as reminders for organizing the pedagogical activity and also as potential testimonies available for community cooperation and decision makers.

The second group of resources is specific to the *real-time pedagogical action*, such as the interactive digital board, and school furniture and textbooks. These resources contribute to the well-being of the class life and to the spatial organization of sessions. They are organised around a pivotal resource (The CNEC idea generator, organizing the sequence by giving students specific writing tasks).

But other resources are heavily mobilized either for bringing solutions to the questions that teachers ask students during the session or to solve the problems that unexpectedly occur during the course.

Overall, we have confirmed the great dexterity of teachers, who did not hesitate to tamper with the "official" guidelines in order to keep their control on the classroom, seizing any opportunity to keep groups on the task.

Perhaps the main point is that teachers systematically gave a priority to what they considered as profitable for the achievement of the task over what was the suggested good practice. In particular, they used resources that have not been officially approved by an academic institution, which they had found on diverse sites.

A fluid classroom practice is then the ultimate legitimation of the use of resources by teachers. The local adaptation of resources is made possible thanks to the collaboration between several teachers (sometimes two, sometimes a collective).

Using different kinds of resources, as described above, supposes that the teacher has a systemic understanding of the situation, which fluctuates from one session to another. This is possible because they are experienced and innovative teachers having a high agentivity and because they inscribe their action in a community of practice.

This community has allowed them to benefit from help, encouragement, inspiration and justification from others and to take the risk of implementing unstable instruments during their sessions and to maintain a balance between, on the one hand, the educational and teaching objectives they pursue and, on the other hand, the reality of the classroom reflected in students' attitudes and technical skills (Baron & Zablot, 2017, Beauné & al, 2019).

In the future, it would be interesting to organize a follow-up of the activities that have been implemented. Teachers who have welcomed us into their class, and to whom we are deeply grateful keep on working on innovative projects: some on the same Savanturiers program and others on other topics such as programable objects such as Beebot and Thymio in order to introduce young students to programing.

In any case, we may surmise that they will organize systems of resources to foster their action along the lines we described here and will manage them collectively.

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Innovative design and the production process of learning resources

Criteria for designing teaching and learning resources to bridge curricular disconnects in English at Danish primary school level

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Abstract

This paper aims to present a set of criteria for designing teaching and learning resources for English as an additional language (EAL) at Danish primary school level, based on an analysis of a teaching unit developed by the authors.

The criteria developed have been informed by a critical participatory action research project carried out in 2018 and 2019 (Fogh Jensen 2019), by previous research on designing teaching and learning resources (Fogh Jensen, Libenholt, Skovmand & Sørensen 2013) and by many years of experience in teacher education.

The method for describing and analyzing the developed teaching unit for EAL at Danish primary school level, takes a language-based point of departure, viewing register (Halliday 2014) as a possible underlying system of progression, enabling students to develop their CALP as well as new knowledge in a cognitively challenging classroom (Cummins 1999).

Keywords

Criteria for designing teaching and learning resources; BICS (basic interpersonal communication skills); CALP (cognitive academic language proficiency), register

Introduction

In 2014 a new school reform was implemented in Danish primary school, introducing English from grade 1. This decision was in part informed by recommendations from a work group under the Ministries of Science and Education (Undervisningsministeriet 2011). Prior to this decision, little research about early language learning had been conducted in Denmark, the actual projects focusing on teacher

competences, learning environment, teaching resources, and how learners thrived in the subject.[52] Looking into European research about early language learning, some findings suggest that an early start does not in itself provide learners with better language competences in the long run (Nikolov 2009). Providing learners with a linguistic and intercultural experience is important (Nikolov 2009), and many learners, especially boys, lose interest due to lack of intellectual challenges and the satisfaction of personal achievements (Nikolov 2009, Nikolov 2016, Edelenbos & Kubanek 2009).

In 2018–19 a critical participatory action research project[53], Bridging Curricular Disconnects, was carried out in an attempt to explore and develop a theoretical and pedagogical foundation for English language teaching and learning in upper primary school, and to uncover which elements potentially facilitate learners' cognitive, social, cultural, linguistic and personal development. In the reconnaissance phase of the project, several curricular disconnects were identified, hence the aim of the subsequent action initiative being the implementation of initiatives that attempt to bridge the curricular disconnects (Fogh Jensen 2019).

Based on this study and many years of experience in educating English teachers and work in the field of implementing language pedagogy in practice in the English language learning classroom, as well as undertaking research within the field of developing criteria for designing teaching and learning resources (Fogh Jensen, Libenholt, Skovmand & Sørensen 2013), this paper aims to suggest a new set of criteria for designing teaching and learning resources for English language teaching at Danish primary school level, based on an analysis of a teaching unit for EAL at Danish primary school level, developed by the authors.

Theoretical framework

This study positions itself in the field between foreign language (EFL) and bilingual education and pedagogy (ESL/EAL), viewing language from a functional perspective with a focus on sociolinguistics, functional grammar, genre and register analysis and sociocultural theories of language learning.

Second language acquisition (SLA) studies of input in language learning have suggested some qualitative features of second language learning, such as Krashen's (1989) suggestion that learners need *comprehensible input + 1*. Long (1983) and Pica (1994) state the importance of *interaction* in SLA. These theories, however, have focused more on specific features at clause level rather than discourse level. Swain, unlike Krashen,

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[52] A few developmental projects were carried out. (e.g. Tollan, L., & Beckmann, C. 2014; Søgaard, K. & Andersen, N.2014; Schæffer, A., 2013)

[53] Critical participatory action research as described by Kemnis, Mac Taggart & Nixon (Kemnis, McTaggart & Nixon 2014)

proposes the importance of language production in language learning. Learners need opportunities to create their own *hypotheses* about language use by producing *language output*. Consequently, learners become aware of gaps in their linguistic systems between what they want to communicate and what they are yet able to do. Moreover, learners need to learn how to vary their language to be able to communicate in socio-linguistically appropriate ways. Towards the development of successful learner identities, *scaffolding* should be used as a tool for gradual release of learner responsibility (Derewianka & Jones 2018) to ensure all learners work within their zone of proximal development, gaining control of and reorganizing their cognitive resources during mediation, since knowledge from a sociocultural perspective is internalized through social activity (Lightbown &Spada 2013).

A functional approach to language

According to Halliday (1985), language is perceived as a complex network of potential choices to be made when communicating meaningfully in the world. The social purpose of communication is influenced by the cultural context, and the choice of an appropriate genre influences *the register*, i.e. the context of the situation. Choices are made through to the three meta-functions of language: *the ideational, the interpersonal* and *the textual*, which permeate the strata going from the context of culture (with all the potential meanings to be expressed) down to specific word choices or instantiations on *the lexico-grammatical level* (Halliday & Matthiessen 2014:31).

The situational context can be described by means of the three register components, *field, tenor* and *mode*. Field represents the expression and connection of ideas in the world and thus reflects the area of knowledge at play in the communicative situation and can be understood along a continuum going from very commonsense, everyday-like to specialized and academic language. Tenor reflects language for interaction and thus relates to interpersonal meanings in a given situational context, ranging from highly emotional at one end of the continuum to formal and distanced at the other. Finally, mode captures how meaning is organized, i.e. whether it is spoken-like at one end of the continuum, or written-like at the other (Derewianka 2012, Halliday & Matthiessen 2014).

Together, field, tenor and mode make up the register of a text and the further to the right in the continuum, the more academic or school-like it becomes. Consequently, any teaching and learning resource with a language-based point of departure could see register as a possible underlying system of progression. The register is formed by contextual constraints, such as communicative purpose and genre, as well as by concrete instantiations of language use at the lexico-grammatical level (Figure 1). At the same time, the three register components are interdependent; if one is changed, the others are affected as well (Derewianka 1990).
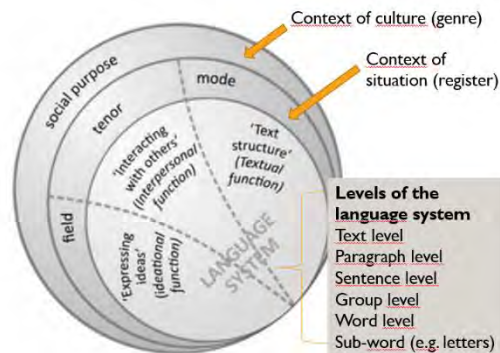
Figure 1: Relating features of context to functions of the levels in the language system (adapted from Derewianka & Jones 2016, p.34-35)

BICS and CALP and a cognitively challenging classroom

To further elaborate on the register continuum as a perspective through which we can see progression in learning, we draw on Cummins (1980/2001) and his proposal of a distinction between the two dimensions of language proficiency: *BICS* (basic interpersonal communication skills) and *CALP* (cognitive academic language proficiency). BICS is synonymous with the context-embedded everyday language we use to communicate in our daily lives, involving the use of gestures and the relation to visible concrete objects, whereas CALP relates to the academic registers of school language, characterized by being more abstract, less personal, more subject-specific and context-reduced. To promote CALP in EAL, teaching must be cognitively challenging and based on *higher-order thinking skills* rather than low-level memorization and application skills (Cummins 1999). Conclusively, to ensure all learners' development of sufficient CALP, language teachers must build bridges between BICS and CALP, facilitating a bridging discourse by using a dialogic approach to classroom talk (Gibbons 2018). Furthermore, academic language must be taught explicitly through carefully planned cognitively challenging courses, requiring the use of higher-order thinking skills (Cummins 1999, Gibbons 2009). Finally, learners should be provided with extensive opportunities to carry out projects, investigating different fields where the learning of subject-related content and language development go hand in hand.

Intercultural competence

In English language teaching (ELT), cultural understanding is a prominent learning outcome in the Danish National Curriculum (Undervisningsministeriet 2019) and thus this strand serves as a relevant point of departure for the selection of content to promote the use of CALP. As we saw earlier, to facilitate

language learning, learners need linguistic and intercultural experiences (Nikolov 2009), giving learners access to knowledge and opportunities for reflection and education when it comes to learning about their own and other peoples' living conditions (Kabel & Svarstad 2019). As the foundation for being able to interact with other people, *intercultural competence* is defined as the ability to mediate between one's own individuality and different cultural perspectives, accepting other people as complex human beings with multiple identities (Byram, Gribkova & Starkey 2002). Consequently, teaching and learning resources for EAL must include working with knowledge about diversity between languages and cultures[54], attitudes – such as being respectful or curious, but also being able to change perspective and be critical towards linguistic and cultural phenomena[55] – and finally, skills[56], developing abilities for observing, analysing, identifying and comparing linguistic and cultural phenomena (Daryai-Hansen, Gregersen, Revier & Søgaard). In our teaching unit, besides having students' development of intercultural competence in mind, we have turned to the field of cultural geography (Anderson 2010) for a content area which is substantial enough to lend itself to advanced language use, e.g. long nominal groups, nominalisation and a simple sentence structure (Lin 2016, Gibbons 2009).

Curricular disconnects

Lin (2016) introduces the concept of *disconnects* as a way of applying theoretical perspectives to practical settings in the bilingual language learning classroom. These disconnects include *intracurricular disconnects, intercurricular disconnects* and *pedagogical disconnects* to be found in curricula as well as language pedagogies (Lin 2016; 59). Intracurricular disconnects are concerned with the way a subject curriculum is organized around its input genres and output genres. Quite often, teaching resources present content and themes using one set of genres while the expected language output requires learners to produce language in a different set of genres. These kinds of teaching resources lack the tools for providing the necessary modelling and scaffolding to enable learners to communicate in spoken and written genres, using an appropriate register and accurate language (Lin 2016). Another disconnect is the lack of connection between content subjects and language subjects, called intercurricular disconnects. Learning and communicating about the subject matter of a field will inevitably be related to learning more specialized CALP, the ability to learn about a topic and the use of higher-order thinking skills. Moreover, learners' exposure to digital media in their everyday lives has created a disconnect between what goes on in the language-learning classroom at school, and the needs learners have for using language in the real world.

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[54] The cognitive dimension
[55] The affective dimension
[56] The pragmatic dimension

We shall also relate to this issue as an intercurricular disconnect. The final *pedagogical disconnect* is concerned about *how* to teach, relating to the lack of progression in the pedagogical functions of "unpacking" and "repacking" language. Teaching resources and teachers are good at unpacking difficult language to ensure students' understanding of texts (Lin 2016). However, helping students to repack difficult language and use it in their output genres often falls short, creating a pedagogical disconnect in the scaffolding of students' linguistic progression from BICS to CALP, or along the register continuum towards a more specialised and academic language (Derewianka and Jones 2016).

Method

Bridging Curricular Disconnects

The project is grounded in a critical participatory action research methodology (Kemnis, McTaggart, Nixon 2014), the participants being two EAL teachers and their classes (grades 3/4 and 4/5) who had been learning English from grade 1. See figure 2 for an overview of the empirical data collected during the project.
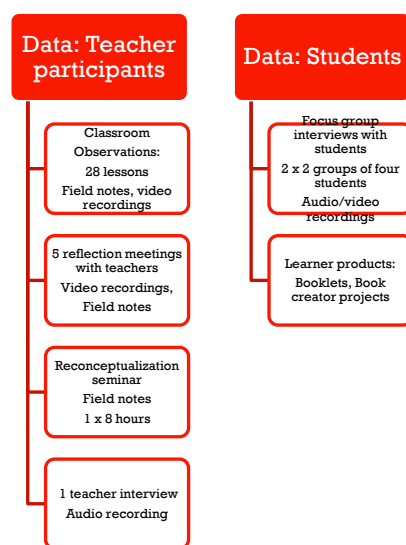

Figure 2: Overview of empirical data from Bridging Curricular Disconnects

Thematic analysis of the empirical data (Clarke, Braun and Hayfield 2015) was employed, the theoretical framework of the study being organized around possible disconnects to be found in EAL curriculums and pedagogies (Lin 2016), and how to "bridge" these.

The register model

We use the register model including the three register components – field, tenor and mode – as recommended by Derewianka (1990) and modified by Mulvad (2011), as the model for analysing the design of our teaching unit. The register model proposes a progression with a point of departure in

students' everyday, common sense understanding of the world. From here, the movement goes towards a deeper and more specialized understanding of the field, positioning the students as experts, enabling them to express themselves in a more writing-like mode.

At the beginning of a teaching unit the context should be established by a shared experience, and to a lesser extent by precise language. This phase is referred to as *action* (Mulvad 2011), an important point being that language requirements are minimal as the context provides and conveys all the meaning. Additionally, the action phase serves to provide a shared experience which the students and teacher together can build on when moving further into the unit.

The action phase is followed by the *reconstruction phase*. Here students are prompted and encouraged to reconstruct their experience, recounting what they did, using language which is slightly less context-dependent. The teacher can bridge students' experience to the subject itself, thus connecting the world of the student to the world of the subject. Moreover, it is also through this phase that the teacher can provide interactional scaffolding through what Gibbons refers to as *micro mode shifting* (Gibbons 2018), moving the students slightly along the register continuum by interactional moves such as *recasting, reminding and handing over* and *talking about the talk*.

The reconstruction phase is followed by the *transformation phase*, in which students are provided with metalanguage that will allow them not only to handle the situation they have just been in, but also other similar situations. In this phase, students potentially will be introduced to emerging elements of CALP when transforming current knowledge into new knowledge (Mulvad 2016). To the students, this means that the content of the unit has meaning and significance here and now, but at the same time, they will be introduced to language which could potentially describe other contexts as well.

The next phase is called the *construction phase*. Here the students are encouraged to both jointly construct a text with the teacher and to construct a text independently. In genre pedagogy, the joint text construction in a school context aids students to see appropriate language choices and good writing strategies as the teacher apprentices them into being competent text producers (Gibbons 2016, Rose & Martin 2012). The students take on emerging expert roles, and simultaneously the teacher withdraws the scaffolding.

Finally, there is a *reflection phase*. Here, learners are able to use language which is more context-independent than before, and in this phase language is used as reflection and no longer just accompanying action.

(Østergaard, 2017, Mulvad, 2016). Potentially, the teacher can evaluate student progression here as their texts reflect what they have learned throughout the unit.

Figure 2: The planned macro scaffolding, register-based teaching and learning cycle, inspired by Derewianka (1990) and modified by Mulvad (2011), from Knudsen & Wulff (2017)

Results and data discussion

Bridging Curricular Disconnects

In the reconnaissance phase of Bridging Curricular Disconnects (Fogh Jensen 2019*), intracurricular disconnects* were observed between language input and students' expected language output. *Pedagogical disconnects* were observed concerning the lack of joint contextual construction of newly learned language (Gibbons 2018), leaving the students with little or no help to "repack" newly learned language, leading to limited development of their language proficiency. Finally, *intercurricular disconnects* were observed, including lack of connection between English and other subjects, but also between classroom practices and students' own needs and use of English in everyday life. Consequently, the action initiative phase focused on trying to bridge the observed disconnects. One of the findings of the project was the importance of well-planned and well thought-out scaffolding of learners' language input and output. Hence, the study proposes that combining language progression with the development of field-specific knowledge as well as scaffolding the planning process of learner texts support language learning a great deal. This became evident in the analysis of classroom observations, teacher and learner interviews as well as in the produced learner texts. Furthermore, the study suggests that for learners, authenticity of texts and activities as well as opportunities for being able to position themselves as knowledgeable contributors to a worldwide knowledge culture has a major influence on learner motivation and self-efficacy. Basically, the learners told me that they wanted to learn something about something in English. For example, in grade 4, they were more interested in whether President Trump might go to prison

(during investigations of abuse of power) than whether "the Easter egg was in the basket or next to the basket".

The teaching unit: My Hood

In the following section we shall analyse the teaching unit, My Hood, considering the theories mentioned above.

My Hood is designed in order to develop students' CALP without disconnects. The overall aim is to introduce a way of describing different places, inspired by the subject of cultural geography (Andersson 2010). The field unfolded here is different neighbourhoods in different parts of the world, including the students' own neighbourhood. Technically, students are exposed to and required to produce what Derewianka and Jones refer to as a descriptive report (2016;160). The purpose of this genre is "to give information about a particular entity by describing its features, history, special characteristics (…)". This means that the students are to learn language for observing and describing. During the *action phase*, a common ground of shared experiences is established as the students are encouraged to go out in groups and take photos of places at their school, taking on the role of explorers. Language demands here are at a minimum as the students are required to do more than to say, expressing meanings through action rather than through verbalisation. Everybody is included, and to start off with a shared experience ensures successful student participation regardless of their vocabulary, communicative competence or socio-economic backgrounds (Rose & Martin 2012: 10).

During the following phase, the *reconstruction phase*, students use their experience as a point of departure for language and content learning back in the classroom. After a few activities with a focus on the vocabulary needed for the descriptions of the photos, the groups describe their photos in plenary. This situation provides the teacher with the possibility of using classroom discourse to micro-scaffold the students through micro-mode shifting, e.g. recasting, reminding and handing over or bridging as they are describing their photos, consolidating vocabulary for description of buildings and places. An information gap activity (Gibbons 2016:56) is designed into this dialogue as fellow students are required to guess the situation of the described place. Information gaps afford language output from students (Swain 1995) and in this particular phase of the unit students get to reconstruct their shared experience in a slightly more context independent language, expanding their field knowledge.

Moving into the *transformation phase*, the students are introduced to the American boy, Landry, who has moved to Qingdao in China temporarily with his family. Landry's language is primarily dominated by

already established linguistic features such as sentence and word group structure as well as vocabulary for the description of the surroundings, providing students with what Krashen refers to as comprehensible input + 1. Students' field knowledge about how to describe places is thus continuously expanded. However, throughout this phase, they are also presented with meta-language about language, such as noun group, participant and circumstance (Derewianka 2012). Their identification of these in the text at the same time serves as a source of information for the students as well as a model text for them, representing also the structure, typical of a descriptive report. Towards the end of this phase of the unit, students take on the role of explorers again as they are to apply the newly-gained knowledge to their own neighbourhoods, investigating their functions of industry, commerce and residential areas, concepts derived from cultural geography (Andersson 2010). Finally, students are introduced to a specific area in Glasgow, Scotland, named Finnieston which is a gentrified area on the bank of the river Clyde. Through a very difficult and compact authentic text from a website (Glasgow Life 2020), students are highly scaffolded to unpack meaning-condensed nominal groups and nominalisations, elements typical for CALP. Moreover, this chapter provides an explicit explanation of these elements, i.e. for which purpose certain people have a need to pack information.

In the beginning of the *construction phase* the students should be nearly ready to construct their independent texts about their own neighbourhoods, but before doing so, they jointly construct a text with their teacher, combining the field knowledge with the language knowledge they have built up throughout the whole unit. Students' contributions are included in the jointly-constructed text and the teacher has another chance of micro-mode shifting, consolidating students' knowledge and emphasising how to pack information, thus ensuring a pedagogical connect between ways of unpacking language and repacking language. By writing a text together, students are scaffolded into being able to write their own independent texts as they draw on shared field and language knowledge in their independent neighbourhood descriptive reports.

In the final phase of the teaching unit, the *reflection phase*, the teacher has a chance to evaluate with the students. A question framework for assessing learner texts is provided, enabling teacher and students to reflect about learning through the produced texts.

Conclusions

Based on findings from Bridging Curricular Disconnects and our analysis of the teaching unit, My Hood, as well as previous research on elements of importance for EAL learning, as described in our theoretical

section, we have developed the following criteria for designing teaching and learning resources for EAL at Danish primary school level.

1. Clear progression in the development of students' language skills, progressing along the register continuum from BICS to CALP, must be provided through macro- as well as micro-scaffolding in the way a teaching unit is designed.

2. Proper macro- as well as micro-scaffolding must be provided to ensure all students work with their ZPD, developing positive learner identities.

3. The provision of linguistic resources to enable students to deal with the transformation of current knowledge to new knowledge and new concepts must be facilitated through the design of a teaching unit, thus facilitating a cognitively challenging classroom using higher order thinking skills.

4. The choice of themes and topics shall allow students to experience cultural diversity and develop abilities to observe, analyse, identify and compare linguistic and cultural phenomena as a potential for developing intercultural competence. This calls for authentic and meaningful texts, themes and activities and the avoidance of trivial content, presenting stereotypical views on cultural issues.

5. The inclusion of bridge-building between English and other subjects in the curriculum and the use of English as a medium for learning rather than a foreign language to be learned.

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How do textbooks demonstrate competency-based design? viewpoints of senior high school mandarin editors in Taiwan

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Abstract

The success of the implementation of an idealistic curriculum is strongly related to textbook editors' interpretation and transformation of the curriculum guidelines. This research focused on the Mandarin language curriculum guidelines for senior high school students, investigating the interpretations and transformation by the editors. Through interviews with the editors, I tried to understand how the editors responded to competency-based design. I found that when editors responded to the competency-oriented design, they maintained their design concepts and added some creative input. Regarding teaching material design, editors intended to cover cross-disciplinary issues through diverse text selection, promoted understanding and thinking through inquiry, combined contemporary issues through appreciation or discussion, and demonstrated a competency-oriented approach in teachers' guides.

Keywords

Mandarin textbook, textbook design, competency-based, Taiwan

Introduction

Taiwan has adopted a textbook review and approval system since 2001, in hope that the looser review can inspire more open and free textbook development, and entitle teachers to professional autonomy. In terms of teaching resources, before 1989, teachers had only the single officially-published version of textbooks. This was later joined by the officially-approved textbooks produced by other publishers, and now teachers can design supplemental materials and develop teaching materials of their own. However, some researches (Lin, Chien, & Yang, 2015; Yeh, 2009) show that the importance of textbooks has not been reduced by the reform of the textbook review and approval system. Teachers and students still rely greatly on textbooks.

According to the curriculum guidelines, textbooks in Taiwan have to be reviewed. Taking the Chinese language as an example, the textbook review usually includes the dimensions of organization, topic selection, content editing, learning activity design, graphic expression, etc. (Li, 2017). Since the review committees usually point out specific mistakes, they review the finished textbook products to prevent publishers from using the review as editing. However, this makes it difficult for the reviewers to suggest any drastic change to the editing. Thus, if the curriculum reform is to be implemented, besides the adjustment of the college entrance exam, it is essential that we also make change to the textbooks. One of the factors that affect the implement of the curriculum ideas is how textbook editors interpret the curriculum guideline and transform it into textbooks.

The curriculum guidelines of 12-Year Basic Education, published in 2014, adopted core competences as the axis throughout the curriculum development in each stage of 12-year basic education. According to Taiwan's latest *Curriculum Guidelines of 12-Year Basic Education: Language Arts – Mandarin* (2018), the goals of senior high school Mandarin education include language proficiency, literary competency, and cultural education. Senior high school Mandarin education focuses on basic language education in listening, speaking, reading, and writing and encourages the development of flexible language use, problem solving, and civic awareness.

The implementation of an idealistic curriculum is strongly related to how editors interpret and transform the key elements of curriculum reform (Goodlad, Klein, & Tye, 1979). The 12-Year Basic Education curriculum reform represents a paradigm shift from teacher-centred to student-centred (Lin, 2017), with more concern for student participation and active learning. Whether textbooks are competency-based in their design is a key point of the curriculum reform. Therefore, investigating the process by which editors transform abstract ideas into concrete and practicable learning texts is vital.

Literature review

The core competencies

Core competencies comprise all the information, abilities and attitudes a person should possess to equip themselves for daily life and for tackling future challenges. The concept of core competency emphasises that learning should not be limited to the knowledge and abilities taught in school, but should consider real-life scenarios and emphasise holistic development through action and self-development (Ministry of Education, 2014). The emphasis is placed on cultivating 'lifelong learners', through active learning, communication, interaction, and social participation.

Some studies have advocated that when developing methods and strategies for competency-based teaching, teachers should integrate knowledge, skills, attitudes, contextual learning, and practice performance (Fan, 2016), while also focusing on learners' individual learning strategies, approaches, and application of learning.

Aim of the Curriculum Guidelines: Language Arts

This curriculum guidelines (hereafter Guidelines) aim to increase competency and develop citizens' diverse literacies. These 'diverse literacies' not only emphasise citizens' ability to wield language but also highlight the aspects of feelings and attitudes. Students should learn to distinguish different social situations and cultural contexts and use language to understand, communicate, and solve problems. Students should be able to handle various linguistic messages and conduct higher-order thinking to integrate information and make judgements (National Academy for Educational Research, 2015).

The Guidelines indicate that Mandarin language education includes the cultivation of language ability, literary taste, and cultural knowledge. They foster students' expression and problem-solving skills to inspire students, increase their motivation, and encourage them to communicate and participate socially and thus lay the foundation of lifelong learning (Ministry of Education, 2018). The *Guidelines* contain learning focuses, including learning performance and content, and each category has its own criteria. The course planning elaborates on the core competencies, emphasising the integration of listening, speaking, reading, and writing as well as the abilities to wield language and think critically. The aim of this planning is to teach students self-learning skills and attitudes. The competency-based design not only includes basic language education but also promotes further development of language and problem-solving abilities within cultural contexts, real-life situations, and social issues. The Guidelines aim to cultivate cultural competency and civic awareness.

Related studies on textbook editing and transformation

Paxton (1999) suggests that there is a 'deafening silence' between those who author, edit and publish textbooks and the teachers and students who use them. Textbook authors publish textbooks that are in line with their beliefs; however, they also have to take feedback from the users, including teachers, students, and sometimes, parents. Editors do not interpret the Guidelines or edit the content in a vacuum, but they embody particular perspectives and viewpoints.

Goodlad, Klein, and Tye (1979) identify five domains of curriculum – namely ideological, formal, perceived, operational, and experiential curricula. Researches in Taiwan tend to focuses on the transformation of teaching, and how teachers perform and respond to curriculum reforms (Li & Chan, 2018; Lin, 2017). However, it is also important whether and how the curriculum creator's intent (ideological curriculum) is reflected in the textbook (formal curriculum). The Guidelines (ideological curriculum) encompass fundamental beliefs, curriculum goals, the teaching schedule, core competencies, learning focuses for each domain and subject, and implementation directions (e.g., curriculum development, teaching material selection and development, teaching implementation, teaching resources, and learning assessment) (Ministry of Education, 2014). Textbooks are published by private publishers in Taiwan. The publishers have the liberty to edit and choose materials for their content and design under the regulations of the curriculum guidelines. How textbook editors understand the Guidelines is key to the implementation of ideas in texts their understanding shapes the Chinese language textbooks. Therefore, textbook editors' decisions regarding curriculum elements are crucial to curriculum writing. Based on hermeneutics theory, Chou (2013) suggested that when interpreting the Guideline in terms of what purpose to serve, editors should abide by the fundamental spirit of the Guidelines, rather than coming up with meanings arbitrarily. However, editors should use their creativity to select and organize materials or activities. Therefore, it is necessary to investigate how the editors interpret and transform the abstract ideas into feasible textbooks of learning.

Methodology

There are five publishers of senior high school Mandarin textbooks in Taiwan. Information about the five textbooks is shown in Table 1. On the editorial side, this study investigated the five publishing companies by carrying out in-depth interviews with them. In each company, this study interviewed the chief editor and another editor who was also a senior high school Mandarin teacher (see Table 2). These data were supplemented by an analysis of the five textbooks to delineate how the textbooks responded to the concept of competency. The interviews raised the following questions: What is competency and how is it stated? Which factors are considered the most crucial in text selection?

The interviews were recorded and transcribed, and then categorised and organised into topics. The result would be analysed and then discussed. The analysis was not performed to compare the advantages and disadvantages of the different textbooks or to scrutinise their differences, but to consider how current textbooks implement the Guidelines, and what related problems may be.

Table 1: Information on the five textbooks

	Textbook Publisher	Textbooks' Title	Publication Date
1	Textbook **A**	Mandarin (volume 1)	2019.8
2	Textbook **B**	Mandarin (volume 1)	2019.4
3	Textbook **C**	Mandarin (volume 1)	2019.8
4	Textbook **D**	Mandarin (volume 1)	2019.2
5	Textbook **E**	Mandarin (volume 1)	2019.1

Table 2: Information from the interviewees

Publisher	Interviewees	
Textbook **A**	1	Chief Editor, textbook editing experience 28 years
	2	High school Chinese Mandarin teacher, teaching experience about 20 years
Textbook **B**	3	Chief Editor, textbook editing experience 20 years
	4	High school Chinese Mandarin teacher, teaching experience about 26 years
Textbook **C**	5	Chief reviewer, textbook editing experience about 30 years
	6	High school Chinese Mandarin teacher, teaching experience about 28 years
Textbook **D**	7	Chief consultant, textbook editing experience 30 years
	8	High school Chinese Mandarin teacher, teaching experience about 20 years
Textbook **E**	9	Chief Editor, textbook editing experience 1 years
	10	High school Chinese Mandarin teacher, teaching experience about 17 years

How to respond to competency-based editing or design

The following are some of the most common methods by which editors implement competency-based teaching.

1. Follow the guidelines

The interviews indicated that some editors believed that 'competency' or 'language competency' was too vaguely described in the Guidelines. They followed the Guidelines as closely as possible to achieve competency-based design. In every textbook, each lesson included an introduction to the topic and author, annotation, question discussion, appreciation, analysis, and extended reading. Most textbooks that followed the Guidelines used this structure.

Besides, Textbook C included key learning points, lesson-beginning inquiries, reading tests. Textbook E added an inquiry section, writing guide, and practice section. In terms of extended reading, Textbooks B and D provided a reading list as well as including a brief introduction to the books to assist students with self-learning. Textbook E recommended books and extended learning through multimedia, including music and films. Most textbooks followed the Guidelines' instruction, except Textbooks C and E. Overall, slight breakthroughs were seen in the textbook structures, particularly with regard to the design of the questions to guide the lesson, examine reading comprehension, and extend knowledge on the topic.

2. Pursue diverse article selection

Since the new Guidelines were released, the editors realised that they needed to select new texts to cover cross-disciplinary articles and keep up to date. Several editors reported that text selection is the most crucial factor in their curriculum design. When selecting a text, they had to consider the quality, authorisation, length, and appropriateness (Interview A1).

Text selection is the core of high school Chinese language textbooks. Editors select texts from the canon, which have been included in the textbook many times. Editors only make slight changes to those texts each time the Guideline is revised. However, one editor reported thinking that texts should not be selected from the already established canon but from works whose values reflect students' real-life situations:

> Canon has a certain power. A canon forms through discourses. Canons are selective. … then, of course, there are some classical Chinese texts you have to choose, but actually we often do not follow others' existing interpretations. We can even criticise such texts and encourage students to look at these texts from a critical point of view (Interview E1).

The everlasting canon is indispensable, but it may limit the possibility of selecting other classical works. The editors also expressed a desire to find vernacular written Chinese texts on topics that inspire students or focus on society. In addition, the editors selected cross-disciplinary articles, such as those related to popular sciences, to respond to the requirements of the Guidelines for diversified topics. One editor reported, 'I don't know whether the teachers can accept it. Chinese teachers prefer literary texts. Doing this is a big risk, but this is the route we must take' (Interview C2). Many editors mentioned that they selected some texts that were different from those they had selected before. For instance, they selected

articles on controversial topics, conflict, and social issues, with the aim of stimulating critical thinking. However, these efforts never proceeded without debate and persuasion in the internal editor meetings.

In the high school text selection map over time, the general selection of classical Chinese texts only displays limited changes, but the editors are gaining awareness of the importance of including diverse materials, such as vernacular written Chinese.

3. Consolidate understanding through inquiry

In the Guidelines, the editing principles stipulate that a 'discussion question' section can be attached to every lesson, as a form of guidance after the text. Some editors also add inquiry before or beside the text. The inquiry starting from students' viewpoints can guide their reading, connect to their life experience, and serve as a reference for teachers to motivate students. The inquiry beside the text serves more as a guide for students' self-learning.

> Their [the students'] understanding process is not that I give them something and they save it, but more like they gradually construct their own thoughts about this article in the process of thinking (Interview C2).

The reading guide before the text and the inquiry and key points index beside the text prompt students to think about the text, leading students to more conscious reading and learning. By using the inquiry, students can share opinions with each other, which helps them gain a deeper understanding of the article.

4. Use discussion questions combined with modern issues

The discussion questions focus on gathering information, reading comprehension, and making connections to life. These questions are designed for situational thinking and play on students' life experiences to foster their reflection:

> …how this lesson can help you in a real-life situation. For example, in the lesson of Chi Chun's (琦君) *Hair Bun* (《髻》), the last question would extend into the discussion of feelings and gender issues (Interview A1).

In other words, at least one question would require higher-order extensive thinking (Mayer, Pintrich, & Wittrock, 2001). If the texts were classical Chinese and the situation and context were different from the

present, the questions would be designed to gradually connect the subject matter to life today. Students start from a modern viewpoint to reflect on different times.

5. Implement the idea of competencies in the teacher's guide

In addition to textbooks, the publishers provide teacher's guides. The editors reported that the teacher's guide is more likely to bring in the idea of competency and contain course structure, reasons for selection, core competency, and inquiry design for each lesson. Teacher's guides can also include more teaching design and activities. They cover all the material needed for teaching:

> Teacher's guides can introduce the concept of competency better and are subject to less limitation than textbooks (Interview D2).

> Teacher's guides contain reasons for selection, teaching focus, matching core competency and inquiry sections; they contain less structure but include more instruction and learning activities' (Interview B2).

Teachers can tailor, select, and adjust these materials according to their teaching and students' learning conditions. Compared with textbooks, which have fixed chapters and items, teacher's guides display more competency-based design. The editors believed that teacher's guides are more flexible than textbooks and that they could reflect the competency-oriented approach.

Discussion questions

The following is a reflection and discussion on the problems of the Guidelines, textbook editing, teaching and assessment, among others.

Role of the Guidelines

The Guidelines represent the principal regulation of courses, teaching materials, and learning. A benefit of the Guidelines is that they explain a subject's objectives, content, teaching orientation, and assessment; however, the Guidelines increase constraints on the subject editor (Fok, 2019).

Some editors think that a guideline should include principles, not in too much detail, and that whether it succeeds depends on its implementation (Interview, D1).

By contrast, the editors who were teachers believed that the Guidelines direct teaching and goals. Through emphasis on the Guidelines, teachers could to some degree understand the level that students were supposed to reach and thus guide them in areas where they had to improve.

The Guidelines have certain regulations for material selection, such as the portion of classical Chinese works and recommended articles. Publishers also have some flexibility in lessons and text editing. According to the principles in the Guidelines, each textbook should still have space for editors' creativity and adjustment.

Notably, some editors reported thinking that the Guidelines represent the highest standard, while other editors thought that it is the basic standard to help teachers to understand students' learning levels and to guide them in the parts to be designed. Because the Guidelines are the basis of textbook evaluation and approval in Taiwan, in order to pass the textbook review, most publishers do not include innovative ideas that go beyond the curriculum guidelines. The structure and layout of textbooks often do not change. Therefore, the Guidelines should be clearly defined as the principal regulators for textbooks, not an instruction to be followed step by step.

Article selection for textbooks

The Guidelines do not regulate the editing of textbooks. Each textbook has its own selecting method and rationale. The interviews revealed that the editing of textbooks was based on previously published articles. The editors selected classical or high-quality articles and then matched them with the learning focus criteria in the Guidelines: '[Editors] select the article first and then develop related teaching focuses on the topics and related themes of the article' (Interview A1). The learning focuses in the Guidelines are not the editors' priority. Their main consideration is text selection.

> In the Chinese language subject, we have to consider whether the writer is important [and] whether this writer's style is powerful enough. For in textbooks, we want to demonstrate the expression of words (Interview C2).

Editors reported thinking that students should learn from the literary style of the selected texts. Thus, in editing, they assign suitable learning objectives to the texts they have selected, instead of considering the Guidelines first and then selecting the texts which match the learning stage indicated in the Guidelines. Further discussion is needed to examine this priority of text selection over the principles in the

Guidelines. Moreover, when changes in text selection are limited, the textbooks have a tendency to feature homogeneous works. These works usually partial emphasis on the learning focuses, neglecting genres such as expository, argumentative, and practical writing.

Competency-based teaching

Editors generally think that producing ideal textbooks is difficult, and it is even more challenging for this to be accepted by teachers. In the interviews, the editors indicated that the textbook's effect on competency-based teaching is limited, but that teachers can be trained to guide students towards competency. Ben-Peretz (1990) suggested that although materials offer starting points, teachers must use their professional imagination to develop their own curricular ideas. Teachers can draw on their knowledge of the subject matter, their past teaching experience, their understanding of the classroom, and their interpretative skills. Teachers in Taiwan need training about competency-based pedagogy and the opportunity to practice these new techniques.

> Actually, you only have to change the teacher who is teaching. As long as this teacher has the sense, even without the points specified in textbooks, they will still bring it forth when teaching; however, if the teacher doesn't have the sense, no matter how much you write for them, they won't see it, and they won't use it. (Interview A2).

Teaching material designers and teachers should have a dialogue regularly. By increasing attention to the ideas and processes of teaching and material editing and designing, the curriculum and teaching materials could contribute more to professional teaching.

Assessment of attitudes and values

The Guidelines mention that the basic principles of Chinese language learning are fostering language ability and cultivating literary and cultural competency. With regards to assessment, language ability is the most suitable for paper-based tests, whereas testing literary and cultural appreciation with paper-based tests is more difficult. Paper-based tests have been the standard for a long time and successful teaching in high school is determined by students' scores. Methods to assess higher-level competency warrants further discussion. This is a problem faced by teachers in the classroom.

Conclusion

Taken together, slight improvements can be observed in textbook structure, particularly in leading students to problem awareness in text-learning, reading comprehension examination, and additional knowledge materials for the text. The approaches most frequently mentioned by the editors were: covering cross-disciplinary issues through diverse article selection, strengthening understanding and thinking through inquiry, combining contemporary issues through 'appreciation and analysis' or 'question discussion', and displaying the competency-oriented spirit in teacher's guides.

The layout of Mandarin language textbooks has not changed much for a long time. The editor can benefit from more innovations in text selection and layout design. In addition, the government should support relevant textbook research and development, provide a reference for editors, and encourage researchers to conduct empirical research on textbook writing and design. Case studies comparing the layouts of Taiwanese and non-Taiwanese textbooks could enrich the pattern and perspective of textbook design and make an improvement in the quality of textbook design.

In Taiwan, classrooms still greatly rely on textbooks (Lin, Chien, & Yang, 2015). Every curriculum reform challenges teachers' pedagogical concepts and methods. Most people believe that textbooks can push the curriculum reform, but in practice, the user of the textbook, the teacher, plays a principal role. Related measures could encourage a better approach to using textbooks through methods such as public performance, demonstration, and idea explanation. This can aid teachers to better understand how different textbooks interpret and implement competency. This could lead to better use of textbooks and improved the teaching practice in the classroom.

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Teaching materials in hospital classrooms. A proposal to meet the specific needs of your students

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Abstract

This article presents a proposal of didactic materials elaborated in the context of a hospital classroom with the purpose of attending to the specific needs of its students. These needs are not only marked by the individual characteristics of each minor, but they must also take into account the circumstances of hospitalization of each paediatric patient, making it possible to respond to some of the objectives of Hospital Pedagogy such as they may be: to favour adaptation to the hospitalisation and illness of the minor, to encourage educational activity in free time within the hospital, to diminish the negative effects generated by the hospital context, to improve the quality of life of the paediatric patient, etc. The main objective of the project was to design proposals of didactic materials in different formats adapted to the needs of the students of one of the hospital classrooms in Spain. Specifically, a small classroom located in the University Hospital Complex of Ferrol (CHUF), which has paediatric patients, mainly, short stay and with mild to medium severity diseases. During the course of the article, the fundamental characteristics of the project carried out are analysed, as well as the main phases through which the design and implementation of the proposed didactic materials have passed and the evaluation of the resources elaborated by the different members of the educational community, which was centred on the observation of the process and implementation of the elaborated materials, the opinion of the students and the evaluation of both the hospital classroom teacher and members of the health staff.

Keywords

teaching materials, hospital classrooms, students.

Introduction

The presented experience is located in the perspective of Learning-Service projects, a methodology "that combines learning processes and community services in a well-articulated single project in which the participants learn how to work on the real needs of the environment with the purpose of improving it" (Puig Rovira, Batlle, Bosch and Palos, 2006, p.22). These projects have acquired special significance in recent years in the international context, through which it is intended to combine the development of academic curriculum with community services (To understand better its meaning, you can read: Santos Rego, Sotelino Losada and Lorenzo Moledo, 2015). In our case, the students and teachers who participated in the initiative have been the protagonists of the initiative as they are the main authors of the developed materials.

The first part of this work reflects on the characteristics and particularities of teaching materials in the context of a hospital classroom. Subsequently, the results of some studies are presented that highlight the lack of didactic materials contextualized in the reality of a hospital classroom and the need to contribute with specific designs to adapt the materials to the socio-educational interventions carried out in these intervention spaces.

The second part describes a proposal of didactic materials elaborated jointly by students of the subjects of Hospital Pedagogy and Design and Evaluation of Didactic Materials, both subjects of the fourth year of the Degree in Pedagogy of the Faculty of Education Sciences of the University of Santiago de Compostela.

The last part of the article establishes some conclusions regarding the project developed, highlighting the need for this type of initiative to contribute to and improve the quality of life of paediatric patients, as well as some proposals for improvement for future editions. In this part of the work we will also present the main contributions made by the developed project to the different members of the educational community: university professors and students, students of the hospital -main target group of the proposal- and professionals of the hospital.

The origin of the project lies in the lack of teaching materials detected in Hospital Classrooms with the aim of contributing to improving the quality of life of paediatric patients from different backgrounds. Educational care in hospital contexts shares many aspects in common with school teaching in ordinary schools but, on the other hand, has many specific characteristics related to the health conditions of the

students, to the space in which it is carried out and the break with their rhythm of life, to the continuous accompaniment of the families, the enormous variability of the group of students and the need for a very flexible intervention, etc. These characteristics will promote the need to implement actions to readjust the balance of the child (Latorre and Blanco, 2010). These issues must also be reflected in the teaching materials used for the socio-educational work carried out in hospital classrooms.

However, the most specific resources for this type of intervention are very limited and are reduced to some stories or games in which the subject of the different illnesses is dealt with, some resources created by foundations specialised in the support of children in a situation of illness and hospitalisation, or some teaching materials created by the teachers themselves in the hospital classrooms with specific objectives to carry out their work. The development of video games that allow the paediatric patient to feel outside of the hospital context and enter into a playful and didactic environment is also on the rise (Guerra y Revuelta, 2015).

In spite of these initiatives, the lack of specific resources is evident in the analysis of the daily work in these educational spaces, as referred to in recent research in which recommendations were made:

> to carry out a review, analysis and assessment of those teaching materials and resources that are used in hospital classrooms on a daily basis and to study their main characteristics, in order to see to what extent they respond to the needs posed by the students who are hospitalized -in a situation of being ill-; as well as to be able to propose the design and elaboration of other alternative materials that meet the objectives and specificity pursued by these educational spaces (Teijeiro, 2019, p.294)

This project has emerged in this context of scarcity of specific didactic materials to work in hospital classrooms, in which students of 4th Year of Pedagogy of the University of Santiago de Compostela take part and study the following optional subjects: Hospital Pedagogy and Design and Evaluation of Teaching Materials. Therefore, the "Paediatric Emergency Suitcase" aims to make educational materials in printed format available to hospital classrooms, developed entirely by university students, for paediatric patients, teachers and families. This project is strictly related to the competencies to be worked on in the Pedagogy degree since it is important to highlight that one of the fundamental competencies of the programme for the subjects of Hospital Pedagogy and Teaching Materials (University of Santiago de Compostela, 2011) is focused on the design of educational media and resources adapted and

contextualized to educational needs in different socio-educational contexts and realities. Likewise, in the area of Didactic Materials, students can acquire strategies that allow them to design and assess the didactic materials in different contours and formats. In this sense, it is essential that, within the framework of the subject that is called materials, the students identify the need for the production of specific teaching materials in the context of hospital classrooms. On the other hand, within the framework of the Hospital Pedagogy subject, it is essential to know, understand and analyse in a comprehensive way the educational situations in different contexts, such as hospitals, being able to adopt and apply the academic and scientific foundations of Pedagogy to these spaces of intervention. It will also be necessary to diagnose the educational needs and the possibilities of educational development of children in a situation of illness, as well as to design educational means and resources adapted and contextualized to these educational needs (University of Santiago de Compostela, 2011).

In order to integrate this project of developing teaching materials into the subjects, Service-Learning is proposed as a methodology, understood as the combination of "learning processes and service to the community in a single well-articulated project in which the participants learn to work on the real needs of this environment with the aim of improving it" (Puig Rovira, Batlle, Bosch and Palos, 2006, p.22). In this way, there are some previous experiences of service-learning in the hospital context in which teaching materials also play a key role. There are also international experiences, specifically in the city of Buenos Aires, Argentina, a group of 3rd and 4th year students from Colegio de la Salle, within their Computer and Plastic Arts curriculum, designed and manufactured games and didactic material which they then took to the children admitted to the "Dr. Juan Garrahan" National Paediatric Hospital, with whom they shared recreational and leisure days. Students also participated in school activities and events at the Hospital School. This service-learning project is called "Didactic material for hospitalised children" (VV.AA., 2006, p. 13). In this same country, but in the city of La Plata, there is also an experience in the production of children's books and audio-visual short films for schools and community organisations, in this case, also in the university environment, as part of the curriculum of the Studies for the Undergraduate and Teaching Degree in Plastic Arts, Undergraduate degree and Design in Visual Communication, Undergraduate and Teaching Degree in History of Visual Arts and Undergraduate Degree in Multimedia Design. All of them linked by the Visual Language 3 subject through which these productions of materials are made in collaboration with the "Creando Lazos" Foundation, which is dedicated to the assistance of children with oncological diseases at the Children's Hospital Sor María Ludovica. This experience, entitled "Count on us", was thus beneficial for the students of the Faculty of Fine Arts, who are enabled to face specific social problems, thus promoting a profile of professional

artist who is supportive and humanistic; and for different community entities and their users, as is the case of the paediatric patients of this hospital (Catibiela, Buján and Tapia, 2018, pp. 21-22).

In this way, being aware of the potential offered by the Service-Learning work methodology in the hospital context and after the analysis of the needs and deficiencies in relation to the resources and specific teaching materials that allow the approach of certain important contents for the students of a hospital classroom, we decided to start the project: "Pedagogical Emergency Suitcase: Didactic materials in hospital classrooms".

The **objectives** that we set out with the project have been the following:

General aim

- To design, apply and assess proposals for teaching materials in different formats adapted to the needs of the students in the hospital classroom

Specific objectives
- To identify the characteristics of the materials used in the socio-educational care provided in the hospital classrooms
- To know how the hospital classroom works, where the educational intervention is carried out
- To detect the specific needs for teaching materials presented in this hospital classroom
- To prepare proposals of didactic materials that favour the follow-up of the schooling processes that are developed in the hospital context
- To experience and assess the proposals of didactic materials and to introduce the relevant modifications taking into account the opinions of the different participating agents.

As for the main **recipients** of the proposal, it is worth highlighting the students in the hospital classroom, the teachers in the classroom and the health staff.

Phases of the project's development.

In order to organise the development process of the project we have taken as a reference some works focused on helping to structure the processes and phases of preparation of didactic materials (Area, 1999;

Didactic Group of Social Sciences of the IRES Project, 1996; Pérez-Lozao, 2017 and Rodríguez Rodríguez, 2006).

Initial-contextualization phase.

a) Contact with the hospital classroom in order to get to know the specific needs of educational materials to work with the profile of paediatric patients who visit that hospital and are recipients of educational intervention.

b) Visit to the Hospital and holding a meeting with the people in charge and with the other Service Learning projects developed in previous years and which continued during this school year. This visit is contextualized within the initial meeting at the beginning of the course, where the general programming of the projects to be implemented from the hospital room is shared with the health personnel.

Design, development, assessment and experimentation.

a) *Initial Session* in which a meeting is held with the teacher of the hospital classroom and once the specific needs of the type of material to be prepared are known, a joint meeting is held with the students of the Hospital Pedagogy and Teaching Materials subjects in order to explain the proposal of the experience and the initiative to be developed. The characteristics and phases to follow in the preparation process of the materials are also detailed. The work groups are made up of between 4 and 6 students, and it is necessary for them to have students from both subjects, in order not to lose the interdisciplinary vision of the project and to ensure the presence of both theoretical and practical knowledge acquired in the Teaching Materials area and in the Hospital Pedagogy area.

b) Development: Design of the material proposals, previously agreed with the students and the staff in charge of the classroom and the style and type of teaching material to be developed. Later we will detail the proposals made. A Facebook account (https://www.facebook.com/maletadeemerxencias.pedagoxicas.1) and an Instagram account (https://www.instagram.com/maletadeemerxencias/) were created, through which a significant contribution was made to the dissemination of the initiative in order to facilitate the dissemination and monitoring of the proposals generated.
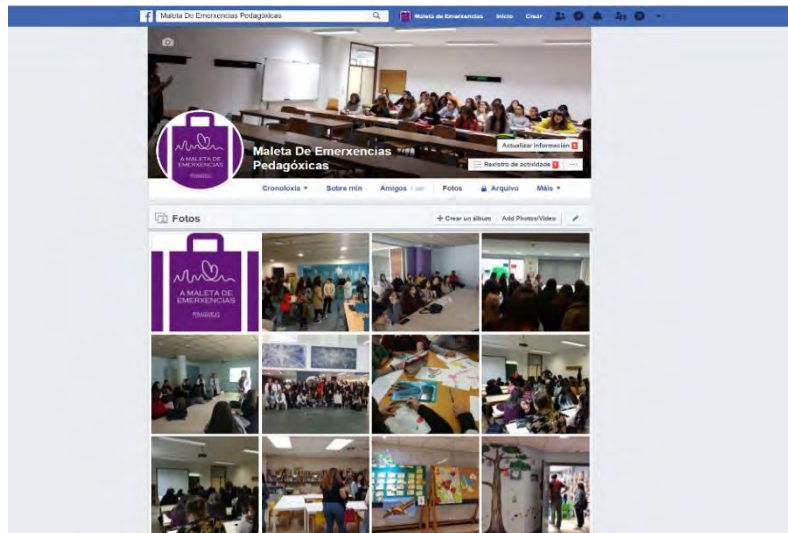
Screenshot of Facebook
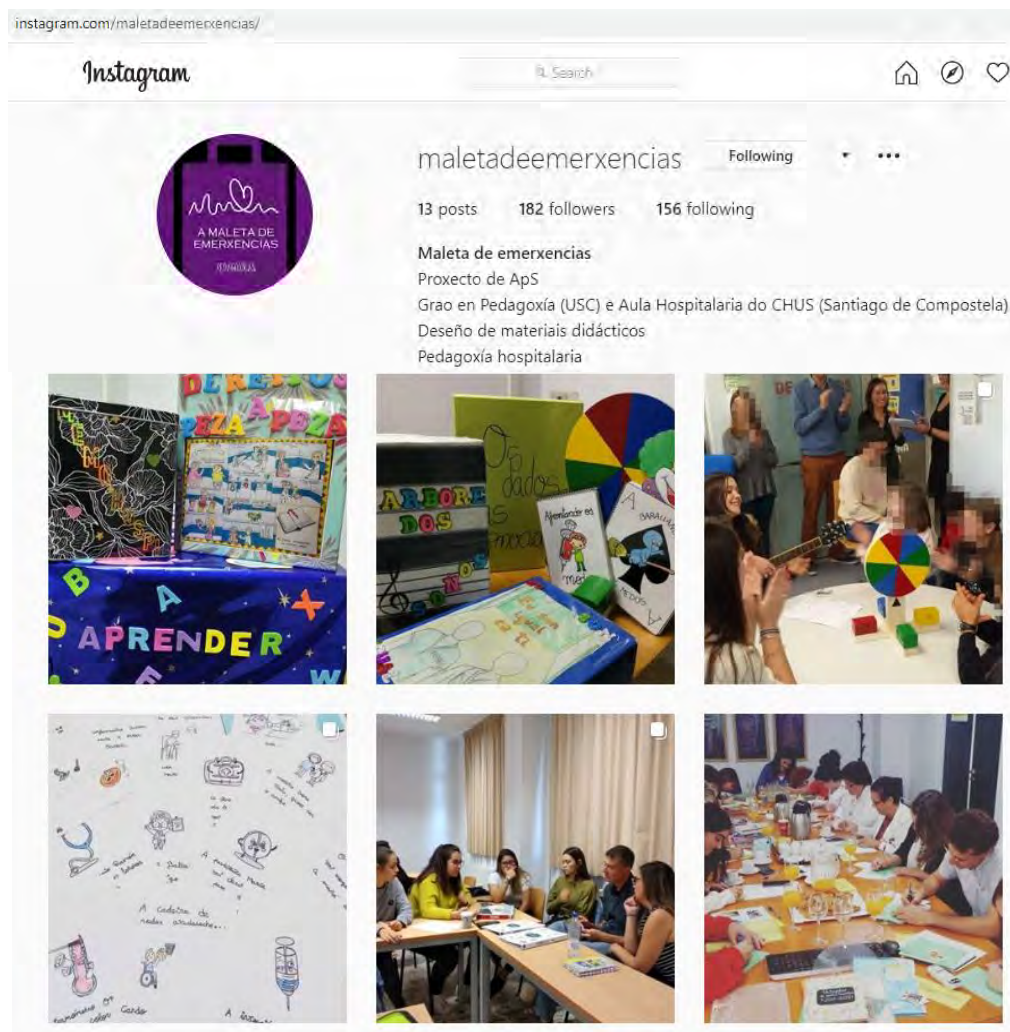
Screenshot of Instagram

c) Assessment: Once the initial proposals for materials have been made, a first analysis and assessment of the proposals presented is carried out together with the personnel responsible for the hospital classroom.

d) Experimentation: Likewise, experiments were carried out in hospital classrooms with teachers and students in November. The experimentation process was carried out with the students in the hospital classroom, the presence of the families and with the professionals of the hospital.

Dissemination of the materials produced.

Once the material was finished, a presentation session of the final material was held in an event that took place in the Hospital Complex itself with the participation of the students involved in the project, the people responsible for the subjects and the person in charge of the hospital classroom. In this session, each group made a presentation of the final material explaining its characteristics and functionality.

Once the project was completed and each of the materials produced was accompanied by a report, the groups were asked to assess the project as a whole.

Prepared materials

There are eight materials that make up the "Paediatric Emergency Suitcase" aimed at paediatric patients, all of which are adapted to the different ages of paediatric patients (between 3 and 14 years old). They were built with materials that can be disinfected and have guides and instructions so that they can be used autonomously by the students or also in teams that are guided or not by the teacher.

The characteristics of each of the materials produced within the overall project are summarised below. It should be noted that the following topics have been used as references:

- Identification and treatment of the emotions experienced by hospitalized children.
- Hospital spaces and existing professions in the hospital, from a gender perspective.
- Most common childhood diseases and illnesses worked on at that centre.
- Music: composition and recording of two songs to work on the fear of injections and syringes and the operating room, as well as a proposal for music therapy.
- The contour of Ferrol: through a game about famous men and women of Ferrol who are recognised due to their activity.

As a summary, these have been the materials produced:

Who is who in Ferrolterra?	A board game consisting of two wooden boards with photos of illustrious characters from Ferrol on some flaps. The material includes a notebook with biographies of the characters to be consulted when a player guesses the opponent's character.
"Guess what you see"	This is a board game with a playful and academic aim. The methodology of the game consists of guessing a word through a drawing made by one of the participants.
"The Tree of Dreams"	This is a material to include music therapy in hospital classrooms as a treatment and specific tool capable of strengthening interpersonal relationships and decreasing the level of pressure and anxiety
"Facing Fears"	Simulating a medical kit, there are several games that have the purpose of helping to overcome fears in different stressful circumstances that may occur in the context of a hospitalization.
"Memo-hospi"	This material consists of a card game that will help the users of the hospital classroom to get to know better the areas of the hospital; it will also encourage the learning of languages,

	since the names of the stays will be written in three languages (Spanish, Galician and English).
"I'm just like you"	The teaching material presented is a domino, playful material adaptable to any space and user (intentionally flexible to the different age ranges and mobility difficulties that can be found in paediatric patients), attentive to the demands of leisure, dispersion and education.
"The dice of emotions"	These are two wooden dice, one with the classic numbering of a dice and the other with the five emotions on which the activity will focus (joy, sadness, anger, fear and surprise) and a last face with the option "Choose the one you want".
"Your rights piece by piece"	This material is intended to be both a tool for fun and reflection; a game that makes for an exciting time and entertaining competition, while deepening the content fundamentally of the Rights of hospitalized children

Assessment

As for the assessment of the project, we tried to assess the impact of the materials produced taking into account the opinion of the students involved in the design of the materials and their experimentation, as well as the opinion of the different professionals and institutions that have participated in the development of the initiative.

In order to know the students' opinion, a nine-question questionnaire was applied combining closed-response items with others of open-response, with the aim of discovering the main learnings of the students, the most relevant aspects of the experience for your subsequent professional performance, the satisfaction, the involvement and the valuation of the project, as well as changes and suggestions for improvement.

To summarise, we could emphasize that **the students participating in** this experience consider that the hospital's addressees and professionals were able to learn from their ideas as future educators and that "an interprofessional communication was established that contributed to the development of the hospital activity, from the collaboration of humanization processes to the improvement of the educational work in a hospital classroom", therefore both parties getting some benefit, students as well as health professionals and paediatric patients, as one of the students says "this represented gratitude to feel that the needs of the hospital of Ferrol are taken into account and that in a solidary way we collaborated with them to improve the situation. The opportunity to learn from each other at the same time".

From the perspective of the university, it is considered that it has been extremely interesting to put into play, on the one hand, the theoretical approaches to the processes of preparation of materials that are handled in the university context and, on the other hand, to be able to enter into the needs, problems and educational approaches that are latent in the hospital context.

In relation to the hospital, the development of the initiative made it possible for the hospital to be a partner in initiatives related to knowledge of the environment and linguistic normalisation.

Likewise, it has found in the development of this project an opportunity to have a proposal of didactic materials to meet the needs of hospital classroom teachers and health workers related to the occupation of students leisure, knowledge of the activities and structure of the hospital complex, awareness of certain topics such as the operating room or injections. In addition, the development of the initiative made it possible for the hospital to be a partner in projects related to environmental knowledge and the normalization of the Galician language.

Final assessments

Through this experience of Service-Learning, the students had the opportunity of developing proposals for teaching materials that respond to specific needs in the context of hospital classrooms.

We are all convinced that we have learned and increased our knowledge about the context of materials development in hospital classrooms and, on the other hand, have developed interesting processes of reflection about the ways that the materials are prepared. Finally, reference should be made to the need and feasibility of developing new boosts to this project. A new interest in this project may be given by the incorporation of interactive material and by the inclusion of other technologies in the proposal since they could contribute in an infinite number of aspects in the development of educational projects in hospital classrooms (Peirats Chacón, Granados Saiz and Morote, 2017).

Likewise, in the development of the project, the need for the didactic materials normally used in the school context, should reflect initiatives that allow working with the experiences of the hospitalized child, in such a way that the reality of the paediatric patient does not suppose an isolated fact and with only educational implications for the subjects themselves, but also for their classmates.

Finally, it should be noted that it would be appropriate for the development of this type of proposal to be extended to other hospitals.

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