Pedagogical Material for Children Regarding Digital Technologies: pilot-study in kindergartens

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Keywords: digital technology; 3-6 children; early childhood education, online safety

Abstract

The Portuguese Ministry of Education developed a collection of three stories for supporting kindergarten teachers in exploring the theme of online safety with preschoolers. These stories were created in book and digital animation formats. We took these three stories to three kindergartens to test their efficacy in scaffolding learning and acquisition of digital skills.

This exploratory pilot casestudy revealed several insights worth pursuing in further research: 1) there is a significant gap between the intensely digitized home environment and low-tech kindergartens; 2) kindergarten teachers acknowledge that ildren are digitally immersed at home and consider that exploring the theme of online safety with young children is imperative;) in spite of enjoying digital media very much, children were more attentive and retained more information when they were told the stories using the books than when they watched the digital animations, claiming that they 'connected' more easily with the storyteller.

In the future, our research will provide guidelines for the development of more pedagogical materials on online safety and test them in kindergartens on a national scale.

Introduction

In contemporary society, children are being born in homes populated with digital devices, and they begin exploring such tools from increasingly younger ages (Dias & Brito, 2016; Hague & Payton, 2010; Plowman et al., 2012). They are 'digitods' (Holloway et al., 2015), immersed in highly stimulating, interactive and participative media environments.

The home setting often contrasts with formal education settings (Marsh, 2003, 2010; Parry, 2014), where digital technologies have yet to find integration in the spaces and daily routines. At schools, digital media are often given the same immunologic response that our body offers

to invasive agents: they are confined to 'computer labs', instead of seamlessly integrated in classrooms (Papert, 2001; Haugland, 2002).

Recent research on young children and digital technology has shown that they are often exposed to risks online because they are, in fact, more skilled and able to perform more activities than parents think (Chaudron et al., 2015; Dias & Brito, 2016; Ponte et al., 2017). Also, parents often resort to digital media as the 'new babysitter', for keeping young children entertained when they have to work, do domestic chores, or wait for long periods (e.g. in restaurants, in hospitals) (Dias & Brito, 2016). However, our pilot-study reiterated that the lack of integration of digital technologies (and often the lack of devices themselves or technical support) in kindergartens was a barrier to harvesting the full potential of digital media for learning (Ertmer et al., 2010; Tondeur et al., 2017).

YOUNG CHILDREN AND DIGITAL TECHNOLOGIES

In the recent years, a significant body of literature has been produced discussing the pros and cons of digital technologies, and considering young children specifically (Brito, 2017; Chaudron et al., 2015; Dias & Brito, 2016; Ponte et al., 2017). This debate has focused on the home, as the *locus* of this premature exposure to digital media, and explored the domestication of devices, how family dynamics are changing (Chaudron et al., 2015; Dias & Brito, 2016; Brito et al., 2017), and how digital media represent at the same time opportunities for the development of children but also threats to their safety and well-being (Livingstone et al., 2017; Livingstone & Third, 2017). Also, this debate has focused on formal learning settings, and research has demonstrated that the engagement with digital media is favourable for learning of such diverse matters and competences such as literacy (Hsin et al., 2014), problem-solving (Falloon & Khoo, 2014; Kim & Cho, 2013), logic (Price et al., 2015), critical reasoning (Wood & Jocius, 2014), autonomy (Kucirnova et al., 2014), and even creativity and sociability (Roberts-Holmes, 2013; Tanyel & Knopf, 2011). Also, the work of Livingstone (2008) has emphasized positive online content, where a model is proposed to assess the extent to which online content is beneficial to children. It is intended to help parents, educators and other caregivers, but also content developers and digital platforms who are interested in building software in a positive way for children.

However, there are several barriers to the integration of digital media in schools, and to harvesting their full potential, such as the lack of specific training of teachers (Lee & Lee, 2014; Tondeur et al., 2017), the lack of investment in technological materials and support (Haugland, 2002), the lack of engagement between schools and families (Van Scoter & Boss, 2002), and above all negative perceptions and attitudes of teachers and/or the school administration regarding digital media (Ertmer et al., 2010).

In this sense, the Portuguese Minister of Education Tiago Brandão Rodrigues recently sent an open letter to schools stating that 'We have schools from the 19th century, teachers from the 20th century, and students from the 21st century' and urging them to make changes and be inspired by the best practices of a selection of progressive and innovative schools.

PROJECT 'PISCA'

'Pisca' [Blinky] is the name of the mascot of SeguraNet, one section of the Portuguese Ministry of Education that is responsible for promoting the online safety of children and adolescents in Portugal. This mascot is a creature with a headlight that blinks whenever it comes across danger, thus warning about it and helping prevent harm.

Aware that children are going online from increasingly younger ages, the Ministry of Education decided to develop pedagogical materials for early education, in order to help kindergarten teachers explore this issue with young children, thus developing their digital skills also from an early age. SeguraNet (2017) created a collection of three stories entitled 'O Pisca faz Faísca' [Blinky Sparks], in which young children use the internet in different settings, at home, on the move and at the kindergarten. The stories highlight the benefits of technology, such as being able to search about personal interests, or to solve concrete problems, and being in touch with parents and family. 'Pisca' comes into scene to warn about dangers such as revealing private information, contacting with strangers or spending too much screen-time, and he always advises young children to only go online accompanied by the teacher, parents, or older siblings.

SeguraNet believed that digital media were the most appropriate means to address online safety, and also that digital animations would be more appealing to the contemporary tech-savvy 'digitods'. These animations are freely accessible on the website of SeguraNet and the stories were also produced in paper version, as the Ministry of Education is aware that many kindergartens lack digital technologies. This was a pilot experience for collecting feedback, and SeguraNet aims to produce more diverse, pedagogical materials on online safety.

METHODOLOGY

We conducted a pilot case-study aiming to: a) determine to what extent the stories are appealing to the children; b) determining if the kindergarten teachers find the stories relevant, useful and suited for young children; c) determining to which extent the children pay attention, understand the stories and retain information about online safety; d) compare the efficacy and preferences of the paper and digital versions; and e) collect feedback, suggestions and new ideas that help in producing more pedagogical materials for early education about online safety in the future.

For these purposes, we selected a convenience sample of three kindergartens, based in the metropolitan area of Lisbon, and on their availability to welcome our research.

In each kindergarten we visited one room of each of the three degrees of Preschool - 3 year-olds, 4 year-olds and 5 year-olds - twice. In the first visit, we read one of the stories to them, using the books. On the second visit, we showed them the digital animation online. Our protocol was the following:

1) 1st visit:

- Presentation and ice-breaker game with children;
- Reading them the story using the book;
- Group interview with the children following a semi-structured script;
- Asking children to draw their favourite part of the story or what they would change in the story;
- Filling an observation protocol while children are drawing.

2) 2nd visit:

- Presenting the digital animated story to the children;
- Group interview with the children following a semi-structured script;
- Individual interviews with kindergarten teachers following a semi-structured script.

Concerning data analysis, we transcribed the interviews and organized them using the technique of thematic analysis (Boyatzis, 1998).

RESULTS AND DISCUSSION

In our results, we identified three insights that helped us understand the role that digital technologies usually play in kindergartens, and that a long way has to be made in order to harvest their full potential, and also close the gap between traditional offline classrooms and contemporary tech-filled homes (Marsh, 2003, 2010; Parry, 2014).

1) Kindergarten teachers consider that exploring the theme of online safety with young children is imperative, as they observe that children are digitally immersed at home. This observation is corroborated by recent research, revealing that 50% of children under 8 years old regularly play with apps and 38% use the internet (Ponte et al., 2017).

The kindergarten teachers elaborate:

Teacher Laura (Kindergarten 3, 4 year-olds classroom): The theme is up-to-date, it is present in our daily lives, and it is a theme that worried us, kindergarten teachers, and also parents. We see that the children, as soon as their parents come to pick them up,

want to grab their smartphones and play. They are also discovering computers, which are often accessible in the home, and it is difficult for parents to be always by their side. It is important that children start realising, early, that the internet can also be dangerous. The internet is good because it provides a lot of information and it keeps us in touch with the world, but it is also dangerous. They must be aware that online they are connected to everything, and that includes risks.

Teacher Margaret (Kindergarten 3, 5 year-olds classroom): Young kids have access to their parents' computers, and sometimes the parents are cooking, or doing something, and they cannot be with the children, really… (...) these stories can help the children be safer.

Teacher Anne (Kindergarten 3, 3 year-olds classroom): It is an interesting resource to work with young children, to help them be aware that not everything is good and pretty, that all depends on what you do and how you do it.

2) Children were more attentive and retained more information when they were told the stories using the books than when they watched the digital animations, claiming that they 'connected' more easily with the storyteller.

Children enjoyed the characters but revealed some difficulties in understanding the themes of online safety. They understood that 'Pisca' warned them about dangers but they were unable to elaborate on such dangers or how to avoid them or deal with them, except for the fact that they should use the internet 'with a grown up'.

Contrary to what expected by SeguraNet, the children prefered the paper version of the stories. Although the lack of technological resources such as Wi-Fi and the quality of the digital animations bear some weight on this preference, the children explained:

Mary (Kindergarten 1, 4 years old): I understand better in the book.

John (Kindergarten 1, 6 years old): Sometimes it disconnects [there were Wi-Fi failures].

Philip (Kindergarten 3, 5 years old): When you showed us the book we could ask questions and you talked to us. On the computer, it was all non-stop and then I forgot my question for you.

3) The lack of engagement with the digital media resulted from a lack of technological resources in most kindergartens.

Digital media were not integrated in the classrooms (Papert, 2001) in any of the kindergartens we visited. In Kindergarten 1, there was an old laptop that served all the rooms, there was a poor Wi-Fi connection and there were no speakers. In Kindergarten 2, all the classrooms had a canvas and a projector, and there was a shared laptop that was slightly more updated, however, there was no internet connection or speakers. In Kindergarten 3, we found all the materials we needed - speedy laptop and internet connection, speakers, canvas and projector - but they were all assembled in the gym for our visit. Thus, the lack of integration of digital media in the classrooms are the biggest barrier we found to exploring the educational potential of engaging with digital media.

CONCLUSION

We believe that one important outcome of our pilot case-study is the confrontation between the academic literature on young children and digital technologies, on opportunities and risks, and mainly on their potential and actual use in formal education settings, revealing two relatively unexpected findings.

On the one hand, the barriers found for engaging with digital media in formal education settings are the easiest to overcome in the sense that they are material (Lee & Lee, 2014; Tondeur et al., 2017). Of course that it demands financial resources, but keeping the technological equipments up-to-date and improve their integration in the classroom is more easily achieved than changing the mindset of teachers and decision-makers (Haugland, 2002). In the kindergartens that we visited, the kindergarten teachers valued digital media and were willing to use them when they perceived benefits for the children.

On the other hand, the children themselves were not as drawn to technology as expected. It was because the exhibition of a digitally-animated story is not as engaging as the games they are used to playing, but it was also because they valued the dialogue with the adult.

Thus, our future research will focus on determining key factors of engagement for pedagogical purposes in formal education settings in early education, considering the degree of participation afforded by digital media, but also relational, emphatic and affective aspects.

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