

HOW WELL PREPARED ARE THE PRIMARY GRADES IN ROMANIA TO USE DIGITAL TEXTBOOKS IN MATHEMATICS AND ENVIRONMENTAL EXPLORATION?

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ABSTRACT

Digital textbooks were introduced in the Romanian education system in the 2014-2015 school year. In order to find out how well prepared were the primary grades teachers and pupils to use the six digital textbooks of Mathematics and Environmental Exploration, for the 2nd grade, we administered a questionnaire. To the questionnaire, with 14 items, 36 primary grades teachers answered on a voluntary basis. We analysed teachers' information and opinions about the following: the context in which they achieved knowledge about the digital textbooks, how adequate the respective technology was, the appropriateness of infrastructure and human resource for using the respective textbooks, the electronic support and the electronic apparatuses used, the context of using them and the forms of organising the activities for their use, the frequency of their use during classes, and the importance of working with those digital textbooks, as well as some of their disadvantages.

Keywords: *primary school education, Mathematics and Environmental Exploration, e-learning, questionnaire survey, "digitally-native" pupils*

INTRODUCTION AND THEORETICAL APPROACH

In the profile literature, the use of digital textbooks is supported by the multitude of digital devices through which learning resources can be accessed, by increasing the number of educational resources and their quality, free access, the existence of a generation of “digitally-native pupils”, and some teachers with digital competences (ME, 2015).

In 2007, in South Korea, the “Digital Textbook” National Programme was launched, based on the virtual interactive book concept. As the experiment demonstrated a 30% increase in school progress by 2014, with the largest increase being for low-achieving pupils, the full transition of training at a national level, through digital textbooks, was predicted (Haq, 2011; ME, 2015, p. 7). In the Russian Federation, the traditional textbook is doubled in a mandatory way since 2015, by an “electronic form”, without replacing it, and it is distributed on the virtual platform of the Ministry of Education from the Russian Federation (<http://cm.ru/demo/>) or of the publishers (ME, 2015, p. 7). Digital books were designed and implemented in other countries as well (Belarus, Ukraine, Lithuania, Estonia, Bulgaria, Turkey, Kazakhstan, etc.) (ME, 2015, p. 8).

In Romania, the first digital textbooks were used for the 1st and 2nd grades, in the 2014-2015 school year (Vlada, 2014). The printed and digital textbooks are posted on the Ministry of National Education on-line platform, The National Evaluation and Examination Center (<https://www.manuale.edu.ro/>).

In this paper, we analyse the primary school teachers’ views of on human resource training and on the use of digital textbooks of *Mathematics and Environmental Exploration* (MEE), for the 2nd grade. The MEE subject was introduced into primary school after 2012, following the change in the curriculum (MECTS, 2012). On the basis of the school curriculum (MEN, 2013), printed books and digital editions were edited in Bucharest and approved by MEN were six textbooks designed for the 2nd grade at this subject (Bălan *et al.*, 2014; Bădescu and Radu, 2014; Dumitrescu *et al.*, 2014; Mihaescu *et al.*; 2014; Pacearcă and Mogos, 2014; Pitiță and Mihăilescu, 2014).

The Romanian profile literature focused, in particular, on the analysis of the school curriculum at MEE subject (Dulamă and Magdaş 2014), the design of learning activities (Dulamă, 2012a, Dulamă *et al.*, 2015), the evaluation of printed textbooks (Dulamă, 2009, 2012b), and there are few studies on digital handbooks (Manasia *et al.*, 2013, Vlada, 2014, Magdaş and Drîngu, 2016).

MATERIAL AND METHOD

Procedure, Data Collecting and Research Material. In this research conducted in 2017, we collected the data using the questionnaire survey method. The questionnaire included eight multiple choice items, 14 items, out of which ten dual-choice items and four questions with a Likert scale of 1 to 5. Three items aimed at collecting data about teacher training for the use of digital textbooks, and 11 items on the use of MEE digital textbooks in the 2nd grade. The Google Drive questionnaire was sent to the participants via e-mail and the Facebook social network. The collected data was processed statistically with the Excel spreadsheet editor. The research material is represented by the answers to the questionnaire.

Participants. 36 primary school teachers completed willingly and anonymously the questionnaire. 91.7% of teachers were female and 8.3% were male. 16.7% of teachers were under 30 years old, 47.2% were between 31 and 40 years old, 25% were between 41 and 50 years old, 11.1% were over 50 years old. 5.6% were graduates of the pedagogical highschool, 77.8% of the teachers had a Bachelor degree, 16.7% had a M.Sc. degree and 0% had a Ph.D.

8.3% of the teachers were debutants, 25% had the final degree, 13.9% had the second didactic degree, 52.8% had the first didactic degree. 19.4% had under 5 years experience in the education system, 11.1% had between 5 and 10 years, 36.1% had between 11 and 20 years, and 33.3% had over 20 years of experience. 41.7% of teachers worked in institutions located in the urban area and 58.3% in rural ones. All teachers worked in state institutions.

Participants lived in the following counties: Bistrița-Năsăud (14), Cluj (10), Harghita (1), Mureș (2), Sibiu (2), and Suceava (7). Even if the number of respondents is small and respondents do not come from all the counties of Romania, their professional experience (years of practice in education and the didactic degrees) ensures the credibility of their answers.

RESULTS AND DISCUSSIONS

Acquiring knowledge about how to use digital textbooks. 91.6% of respondents learned how to use digital textbooks through exercise, using it, through experiential learning. 50% of teachers claimed they had learned how to use it resorting to existing internet content, although they were few. 44.4% of teachers were informed about the use of the digital textbook from the materials they had received from the publisher. The fact that 27.7% of

teachers learned from a training course paid from their own resources indicated their interest in professional development. Few of the teachers learned to use these digital textbooks in formal contexts (Masters in Education Sciences - 19.4%, Bachelor in Primary and Pre-school Education - 13.8%, Free Vocational Training - 11.1 %), or using the support materials from the Ministry of National Education and Scientific Research (MENCS) (19.4%), from the County School Inspectorate (ISJ) (16.6%), from the methodical circle (5.5%), and from the Institute of Educational Sciences (IES) (2.7%), indicating some gaps and deficiencies in the education system from Romania.

Adequacy of technology, infrastructure and human resource to the use of 2nd grade MEE textbooks. Table 1 shows that, according to teachers' opinions, technology corresponds to a large extent to the use of MEE digital textbooks, both for pupils and teachers, and the situation is perceived paradoxically better in rural areas.

Table 1. Adequacy of technology, infrastructure and human resource to the use of 2nd grade MEE textbooks

	Indicators	Average
Technology and infrastructure	Technology in rural schools	3.83
	Technology in urban schools	3.80
	The technology available to primary school pupils in rural area	3.71
	The technology available to primary school pupils in the urban area	3.70
	The technology available to primary school teachers in the rural area	3.69
	The technology available to primary school teachers in the urban area	3.60
	Infrastructure in the Romanian educational system	3.16
Human resource	Primary school teachers' digital competence	3.61
	Primary school teachers' experience of the use of digital textbooks	3.33
	Primary school pupils' experience of using digital textbooks	3.30
	Primary school pupils' digital competence	2.97

However, across the education system, infrastructure is perceived as less suitable for the use of digital textbooks. In terms of the competence and experience of teachers and pupils in the primary school cycle related to the

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use of digital textbooks, the averages are smaller than those related to technology. These results may be explained by the recent introduction of digital textbooks in schools and the fact that these years have been too little used by teachers and pupils, which is why they have not been able to gain the necessary experience to develop high level competences. We consider that, for the optimal use of digital textbooks in the primary school cycle, the necessary contexts for the use of digital textbooks should be created.

The need to use the 2nd grade MEE digital textbooks. Primary school teachers believe that the use of digital textbooks is most needed to adapt pupils to the digital age (average 3.66) and to the pupils' learning needs, called "digitally-native" (average – 3.50). Moreover, the use of digital textbooks, according to teachers' opinions, would also increase the efficiency of the didactic process (average 3.41), but without major implications in reducing the costs of the didactic process (average – 2.69).

Teachers' analysis of the 2nd grade MEE digital textbooks. 97.2% of respondents said they had analysed a 2nd grade MEE digital textbook and only 66.60% of them said they had looked at several MEE digital textbooks, probably because they did not teach that class, after the introduction of those digital textbooks. 86.1% of the teachers analysed 2nd grade digital textbooks for different subjects and 50% of the respondents analysed digital textbooks for different school subjects for different classes. Only 11.2% (4 teachers) analysed digital textbooks for various school subjects from other countries.

Forms of use for 2nd grade MEE digital textbooks. 88.8% of respondents said they had used the textbook together with the class of pupils they taught, 69.4% had used the textbook individually, 52.7% had used it with other teachers, and only 41.6% had used it with a pupil or his/her own child.

Places where the 2nd grade MEE digital textbooks were used. From the teachers' answers, it appeared that they had used those digital textbooks in different places: mostly in the classroom (88.8%) and at home (61.1%). The fact that 56.5% of the respondents used them in the PC lab demonstrates the poor access of the primary school classes in those spaces and the existence of somewhat favourable contexts for the use of teacher-guided digital textbooks. 22.2% of the respondents used the digital textbook for continuous training, indicating either a poor offer of such courses or a poor participation of teachers in such courses. 22.2% of teachers used MEE digital textbooks in other contexts.

The electronic support from which a 2nd grade MEE digital textbook was used. 83.3% of the primary school teachers worked with the digital textbook using the CD received from a school pupil. More than half of them used the textbook by accessing the website of the Ministry of National Education and Scientific Research (<https://www.manuale.edu.ro/>) (55.5%) or used the CD received from a teacher at school (52.7%). So there were

teachers who had not used these digital textbooks yet. Only 10 teachers (27.7%) of those surveyed purchased the CD from their own resources and a teacher (2.8%) used the CD bought by a parent, probably because he or she did not receive CDs from official sources.

The devices with which they used a 2nd grade MEE digital textbooks. Most of the participants (86.1%) claim that they used the digital textbook on a desktop computer, and 83.3% of them used a laptop. A small percentage of teachers who used these digital textbooks on a tablet (11.1%), smartphone (5.5%) and on eBook Reader (2.7%), indicate that teachers do not own this devices (tablet, e-book Reader), or have not used them for this purpose, for various reasons (small screen or lack of internet access on smartphone).

The percentage use for 2nd grade MEE digital textbooks. The primary school teachers surveyed mostly used the digital textbook by visualizing it on a laptop or desktop computer (average 3.57) and using a video projector (average 3.29). The digital textbooks were rarely used by accessing them on each network computer (average 1.43) or by each pupil having a personal computer / tablet / e-book reader (average 1.18). We can deduce that primary school teachers use these textbooks predominantly by directly introducing them in front of the pupils (a stationary computer / laptop and a video projector) and not by using them individually by pupils with the help of some devices. This situation is due, in the first place, because many schools and many pupils do not have the technology needed for the optimal use of these textbooks.

Studying the 2nd grade MEE digital textbooks published in 2014 by publishers from Bucharest. Most of the teachers studied the digital textbook from Intuitex Publishing House (82.3%) and from CD PRESS (69.6%). The textbooks from the other publishing houses were studied by less than half of the respondents, the least studied being the one from Corint Publishing House (19.3%).

The use of 2nd grade MEE digital textbooks by teachers with a pupil / their own child (Table 2). Teachers had rarely used the digital textbook with a pupil or with their own child, and when they used it, they preferred the one from Intuitex Publishing House (62.5%) and the one from CD PRESS (54.8%).

Teachers' use of 2nd grade MEE digital textbooks together with pupils from their class (Table 2). Most of the respondents (54.8%) used the digital MEE textbook from CD PRESS and 46.8% used the one from Intuitex Publishing House. The other MEE digital textbooks were used together with classes of pupils by under 10% of the teachers.

Using the MEE digital and printed textbooks (Table 3). 90.9% of the respondent teachers preferred to use the 2nd grade MEE digital textbooks in parallel to those printed, and 74.1% of them considered that the introduction of the digital textbook should have been done gradually (this actually happened in Romania, because each year digital textbooks were introduced to another class). Only 16.1% of the respondents would have completely abandoned the use of digital textbooks, preferring only the

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printed ones, but none of the respondents would have given up the printed textbooks. 75.7% of the respondents believed that it was best to use a single good quality 2nd grade MEE digital textbook, which was an opinion similar to ours, and only very few (16.6%) preferred to use more MEE textbooks, of various quality.

Table 2. Studying and using the 2014 edition of MEE digital textbooks by teachers with a pupil, with their own child and with the pupils in their class

Textbooks	Studied by the teacher (%)	Using it with a pupil / their own child (%)	Using it with the pupils in their class (%)
Intuitext	82.3	62.5	46.8
CD PRESS	69.6	54.8	54.8
ART	44.4	30.0	10.3
Aramis	41.9	17.2	7.40
Corint	19.3	10.3	3.70
Didactica Publishing House	36.5	7.10	3.70

Table 3. Use of the MEE digital and printed textbooks

Indicators	Percentage (%)
Using the digital textbooks in parallel with the printed ones	90.9
A single good quality 2 nd grade MEE textbook	75.7
Gradual introduction of digital textbooks to the primary school	74.1
Several 2 nd grade MEE textbooks, of various quality	16.6
Completely give up digital textbooks	16.1
Completely give up printed textbooks	0.00

The drawbacks of the 2nd grade digital MEE textbook. According to the respondents' view, the MEE digital textbooks, and perhaps for other subjects as well, have some drawbacks. The fact that the design of the textbooks differs from one publisher to another was considered to be the biggest drawback (average 3.11), probably because it caused some difficulties in using them, especially if pupils and teachers worked on various

subjects with textbooks from multiple publishers. They also found disadvantageous the fact that the icons differed from one textbook / publisher to another (average 2.97) and that the navigation mode differed from one textbook / publisher to another (average 2.68). Our suggestion is to create a legend of icons to be used by all publishers, for all the textbooks, and to harmonise navigation systems with school textbooks to facilitate using them.

CONCLUSIONS

At the end of this study, we have reached some conclusions regarding the preparation of the primary education in Romania for the use of MEE digital textbooks. Most teachers analysed a MEE digital textbook, the most studied and used being the ones from Intuitex and CD PRESS.

The teachers and students were less prepared to use their digital textbooks, especially because they learned how to use them by exercising, in class and at home, on a desktop computer or a laptop, using the CD received by pupils at school.

The use of digital textbooks was considered necessary. However, this would not reduce the costs of the teaching process. Teachers preferred to use digital textbooks alongside the printed ones, and thought it was best to use one quality textbook, than a variety of them, of different quality. The weaknesses of the textbooks were their design, pictograms and navigation mode, because of the differences generated by different publishers.

The education system infrastructure was perceived as less suitable for the use of digital textbooks, even if at the level of some schools, the technology corresponded to the use of MEE textbooks. Teachers used these textbooks predominantly in face-to-face teaching activities, presenting them with a video projector because they did not have the necessary technology for their optimal use.

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