THE IMPACT OF THE EDULAB MODEL ON THE LEARNING PROCESS: STUDENTS AND TEACHERS' PERCEPTIONS

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ABSTRACT: Currently, it has been implemented and tested, in ten Portuguese schools grouping, a new model of technologies' integration in education: the EduLab model. This model seeks to promote the development of digital literacy, knowledge and competencies of teachers and students involved in it by creating classrooms equipped by educational and technological resources. In addition, the EduLab model predicts teachers' training and pedagogical accompaniment, seeking to encourage the adoption of innovative teaching practices, using the technologies that will lead to an improvement of the educational process. This study intends to assess the impact of the EduLab model on improving students' learning ability in the School Grouping of Gafanha da Nazaré (Aveiro, Portugal), one of the groups of schools that integrate this pilot project. To this goal, it was used the survey technique and were applied two questionnaires: one for students of the second, fifth and eighth grades and another for teachers involved in the project. The majority of students in the second and fifth grades refers that they enjoy using these technologies having a positive impact on their learning. The students of the eighth grade are not so confident and, mostly, do not recognize that technologies provide them a better learning. Teachers involved believe that technology has a positive impact on students' interest, motivation and participation. They also note that technologies support the development of disciplinary skills, promote the development of specific skills and an autonomous and student-centered learning.

Key words: EduLab model, technologies, learning, students and teachers' perceptions.

INTRODUCTION

The research underlying in this article is part of the first author's doctoral project in Multimedia in Education (University of Aveiro, Portugal), and the second author is her supervisor. This PhD project aims to evaluate the impact of the EduLab model on basic education. In addition, this study is integrated into AGIRE project (Apoio à Gestão Integrada da Rede Escolar - Support for School Network Integrated Management), a collaboration between the Consortium E-Xample (which gathers 26 companies in the areas of education and/or technology), the Department of Education and Psychology at the University of Aveiro (Portugal) and the Gafanha da Nazaré School Grouping (Aveiro, Portugal) (AEGN). The EduLabs project is a pilot project, which involved ten groupings of Portuguese schools in 2014/2015 academic year, including the AEGN, with the goal of creating educational experimental ecosystems where, through provision and the use of educational technology resources, seeks to promote innovation in education.

This paper aims to evaluate the impact of the EduLab model, and therefore the integration of technology in the educational process, in student's learning, considering their own perceptions and those of the teachers involved in the EduLabs project. In order to achieve this aim, surveys were applied to teachers and students involved in the AEGN EduLab. This chapter begins by presenting the principles of the EduLab model and the theoretical foundation with emphasis on this research in particular, namely, on technology integration in the educational process and the perceptions of students and teachers resulting from studies that were implemented in this area. The following chapter presents some methodological considerations, including the techniques and tools for collecting and processing data. Subsequently, we present the results of this study that focus in the first part on the students' perceptions and then on the perceptions of teachers. Finally, we formulate the main conclusions and recommendations for future work.

EduLab Model

In recent years, Portuguese schools are implementing several programs to encourage technologies' integration in education, a reflection of the technological advancement on today's society. The EduLab model aims to be assumed as a new model for technologies' integration in an educational context. By equipping the schools with

educational resources, the technological oriented EduLabs, or educational Labs, seek to develop skills and digital literacy of those involved and responds to future generations' interests and needs.

Classrooms involved in EduLabs are equipped with computer, projector and interactive whiteboard and both pupils and teachers integrated in the project, have a tablet with digital books, Open Educational Resources (OER), e-learning software/classroom management (Mythware) and Internet access (Figure 1). Students of the first cycle of basic education (6-10 years), instead of a tablet, have a laptop, "Magalhães", designed specifically for children: robust, resistant and with reduced dimensions (8.9-inch screen).

Figure 1. EduLab Model (adapted from E-Xample, 2014)

More than equipping schools with technology, as it happened with many projects that were implemented in Portugal; the EduLab model provides teachers' training and accompaniment as a way of encouraging the adoption of educational formats seeking appropriate and innovative performance. In this way, it is intended to provide a dynamic and more efficient teaching and learning process, with students, teachers and parents' involvement.

The EduLab model puts the focus not only in the technology implementation and integration in the classroom but also in the evaluation of its impact, advocating that evaluation can promote innovation in education. In this sense, this model intends to reach the following dimensions: *i)* digital literacy of the people involved; *ii)* teachers' training aiming technologies' integration in the educational process; *iii)* innovation in pedagogical practices; *iv)* community involvement, particularly the parents; and *v)* digital content and platforms to support management and dynamization of classes and other educational tasks (Pombo, Carlos, & Loureiro, 2015).

The evaluation recommended by the EduLab model has an essentially formative character and aims to provide relevant information on the impact of technologies on the above dimensions. It intends, above all, understand deeply the relationship between innovative educational practices, learning ecosystems enriched by technology and the improvement of students ' learning as well as digital literacy of the ones involved.

Technologies in Education

The current society has a strong scientific and technological component and, in this sense, the technologies assume a vital role in different areas, looking to improve the quality of life of all individuals. In order to keep up with the technological revolution clear in recent years, the school has been suffering important transformations regarding pedagogical strategies adopted, the working arrangements proposed and how the information is conveyed.

The European Commission, in a communication "Opening up Education: Innovative teaching and learning for all through new Technologies and Open Educational Resources" (2013), argues that the potential benefits of the information technology revolution in education are several and that technology is an opportunity to increase education' efficiency and quality. According to this report, technology enables people to customize and individualize learning methods and makes knowledge no longer confined to classrooms and to specific class time, since students can easily acquire knowledge from other sources in addition to their teachers.

Valente and Osório (2006) state that children are attracted to technologies in an almost impulsive way and alert to the fact that the school doesn't always take advantage of that motivation for the development of other learning skills. Schrum and Levin (2009) consider that school must seek to develop in students the 21st century skills, including critical thinking, problem solving, creativity, innovation, communication and collaboration.

Balanskat, Blamire and Kefala (2006) synthesize a series of studies that claim that technology has a positive impact on students' motivation, concentration and behaviour, promoting communication, collaboration and learning, which becomes more active and autonomous. Jonassen (2007) states that students should learn with technology and that, if it is used as cognitive tools, may promote construction of knowledge and the students' development of creative and complex critical thinking, some of the 21st century skills referred by Schrum and Levin (2009).

The Organization for Economic Co-operation and Development (OECD, 2015) argues that technologies have the potential to improve the education and teaching in a number of ways, including through the involvement of students, giving them control of their learning. The report "Students, Computers and Learning – Making The Connection", the OECD (2015) draws attention to the fact that, generally, technology may increase the efficiency of already efficient processes but it can also cause inefficient processes to become even more inefficient. According to the OECD (2015, p. 6), "*technology can amplify great teaching, but great technology cannot replace poor teaching*".

Despite the vast benefits of Information and Communication Technologies (ICT) use in educational context, Ruivo and Mesquita (2013, p. 22) emphasize that, in order to promote changes in the educational process, digital technologies should not be used as *"simple machines to teach or learn, but as pedagogical tools that create an interactive environment that will provide the apprentice, facing multiple problem situations, to investigate, raise hypotheses, test them and reset initial ideas, building their own knowledge"*.

The EduLab model assigns special importance to 1:1 relationship since each student has access to a device, tablet or laptop, which can be used either in school, in formal learning activities, whether at home, to study or to other informal activities.

Balanskat (2013) suggests that the use of tablets should not be limited to the classroom, so students should use them in informal or non-formal learning environments and that should be further exploited by teachers. According to the author, the use of tablets in the informal or non-formal learning contexts, where tablets are used to extend learning beyond the formal classroom context, may lead to radical changes in the practices of teaching and learning. Rodrigues (2013) states that the 1:1 relationship only improves learning if learning opportunities with the technology are promoted and not only the access to technology.

Howard and Rennie (2013) distinguish two models of implementation of projects that are based on 1:1 relationship: the model of saturation and the adoption-diffusion model. In the model of saturation, all students take advantage of the devices, regardless of the use that is made by the teachers and the integration in their practice. This model predicts that students have the responsibility of guarding the device, which ensures continuous access to technologies. Adoption-diffusion model recommends that the implementation of 1:1 programs should start from teachers' involvement so that they can integrate the devices into their practice and encourage its use in learning. In this model, students might have, or not, the guard of the device and the possibility of the use beyond the classroom.

Additionally, Lanzi, Ferneda and Vidotti (2011) synthesize some benefits of using tablets: mobility (light and reduced dimensions); practicality (several functions); ease of use; fun (of recreational activities); and diversity of applications. Clarke (2012) highlights some educational benefits of programs that encourage the 1:1 relationship: motivation, improving the classroom environment and communication (with teachers and between students) and autonomy. However, Howard and Rennie (2013) stress that the potential benefits of individual use of technological devices have not yet resulted in measurable gains in student learning. However, Bannister, Balanskat and Engelhardt (2013) define a set of practical lines of guidance for 1:1 initiatives implementation. In the field "Maintenance and Support", the authors point out the importance of wireless network quality, device characteristics (weight, autonomy and possibility of connection to other devices which might be used in school) and the existence of a technical support at school, to which the teachers can appeal if necessary.

Perceptions of Students and Teachers

In a study conducted in three schools in the United Kingdom, involving 18 focus group of students, parents and

teachers, Clarke (2012) sought to evaluate the process of integration of the tablet in the teaching and learning process. According to the author, the students involved consider to be more motivated to learn and highlight the fact that the tablet allow their learning in a more fun and diverse way given the variety of resources and opportunities it offers. In the context of this study, the teachers consider that the tablet has caused changes in education, as teachers started to "facilitate" learning, rather than to instruct. In addition, teachers report that students have become more autonomous and more involved in the schoolwork. However, these teachers report differences between the groups, noting that younger students report more benefits of using the tablet in learning, although they need further support.

The report that presents the results of a pilot study of introducing tablets in education, held in 63 schools from eight European countries, with 263 teachers, Balanskat (2013) states that more than half of the teachers involved claims that the most rewarding result was the students' motivation increase. These teachers also highlight the fact that they have had more opportunities to implement new methods of teaching. In this study, 41% of teachers' state that the use of technology has a very positive impact on students' learning, while 45% considers that technologies have an impact on students' learning and the remaining claim not to recognize any positive impact. In a more specific context, such as the tablet, 46% of the teachers agree and 13% disagree that the use of the tablet has a positive impact on students' learning (the remaining claim not to agree or disagree).

Moreover, Lewin and McNicol (2014) present the results of a pilot study, the iTEC project, carried out in 17 countries, where they intended to assess the impact of the integration of technology in teaching and learning process. The results of the questionnaire applied to 1399 teachers and 1488 students reveal that both teachers and students consider that learning mediated by technologies contributes to the development of 21st century skills, such as, independent learning, critical thinking, solving real-world problems, communication, collaboration and creativity, as well as digital literacy in students. Both teachers and students recognize the positive impact of the iTEC project on students. Teachers highlight the attitudes and the involvement of students in the school work. According to teachers, increased motivation and autonomy are two of the most important benefits of technology integration into the curriculum. Students reported that the project had a positive impact on their involvement in activities and learning. 85% of the students agree that became more confident in the use of technologies and 86% stated that, after the project, are able to use a wider range of new technologies.

METHODS

The research presented here is a case study of a mixed nature, which aims to assess the impact of the EduLab model on the teaching and learning process. This paper, in particular, focuses on the impact of this model in the learning process, considering the perceptions of the pupils and teachers involved.

In the 2014/2015 academic year, twelve teachers and five courses were involved in the AEGN project EduLabs, distributed by three cycles of basic education. In order to evaluate the impact of the EduLab model in the learning process it was used the survey technique and then proceeded the application of two questionnaires: one for students, (https://docs.google.com/forms/d/1Sduy9CAg_UF8257aF2yZXQXTWtTwvcma48v0TNS2vGc/viewform) and other for teachers (http://goo.gl/forms/9SdjS5Duvs).

The questionnaire applied to students was conducted online and filled in by 19 students of the second year (7/8 years), 20 of the fifth year (10/11 years) and 22 of the eighth grade (13/14 years). Its implementation occurred in February 2015, roughly in the middle of the first year of implementation of the project in EduLabs AEGN. The students' questionnaire, essentially, aimed to know: *i)* the taste for the use of different resources provided by EduLabs project; *ii)* the existence of difficulties in the use of these resources; *iii)* their opinion on the resources' contribution for learning; *iv)* students' preference between using the digital or the paper student book and their justification; *v)* their perspective on the changes in class raised by technological resources, as well as other suggestions for its use; and *vi)* their interest in joining the project in the following school year. In addition to these issues, common to the questionnaires applied to all students, the questionnaire applied to students in the fifth and eighth grades also intended to determine the opinion on the contribution of the tablet for home study.

In addition, to seek the perspective on the impact of technologies in the teaching and learning process, the questionnaire applied to teachers meant to identify the frequency that teachers use technology in the classroom and some factors that contribute to a less frequent use of this resource type. Concerning the level of impact of the EduLab model on the learning process, with particular emphasis in this paper, the questionnaire allowed to know what teachers think about: *i)* the effect of technology on students' attitudes (interest, motivation, participation, attention/concentration and autonomy); and *ii)* the contribution of technology for the development of students'

skills. This questionnaire was online filled in a year after the beginning of the EduLabs project implementation by 11 teachers.

The data collected using the teachers' questionnaire, given its quantitative nature, were the subject of statistical treatment. The data collected through the questionnaire applied by students were also subject to statistical treatment, although, some items, by their nature, were treated through qualitative content analysis. The results are presented in the next chapter.

RESULTS AND FINDINGS

In this chapter, the results from surveys application are presented, that allow evaluating the impact of the EduLab model on the learning process. Initially, it focuses on the perception of students from second (7/8 years), fifth (10/11 years) and eighth (13/14 years) grades, then, it is considered the perspective of the teachers involved in the AEGN EduLab.

It should be noted that, due to the rounding of the percentages of students, in tables 1, 3, 6 and 9 the sum of the relative frequencies do not make up to 100%, with a maximum deviation of 1%.

The impact of the EduLab Model on the Learning Process: the perception of students

The results presented focus on the students' perception in relation to the interest and use of the resources available in the context of the EduLabs project, as well as their contribution to the students' learning.

In general, the students of the second grade referred they like to use the interactive whiteboard, the computer, the Mythware software, OER and the digital book. It is highlighted the existence of only 11% of students (value that corresponds to 2 students) who likes a little to use Mythware software and 5% (1 student) who likes a little to use the OER (Table 1).

Table 1. Interest of Students (2nd grade) by the Use of Technological Resources

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	0%	0%	11%	89%	0%
Magalhães	0%	0%	21%	79%	0%
Mythware	0%	11%	16%	74%	0%
OER	0%	5%	11%	84%	0%
Digital Book	0%	0%	21%	79%	0%

Regarding the fifth-grade level, it can be said that, in general, students like to use the different features. However, while students of the second grade are mainly in the "totally" level, the fifth-grade students' preference appears clearly distributed by levels "very" and "totally". Compared with the second grade, there are also a higher number of students who like a little to use the interactive whiteboard (15%; 3 students), the tablet (5%; 1 student), the Mythware software (15%; 3 students) and the digital book (15%; 3 students). It turns out that, at the level of the fifth grade, 5% of the students (1 student) like a little to use OER and 5% (1 student) expresses dislike on using it (Table 2).

Table 2. Interest of Students (5th grade) for the Use of Technological Resources

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	0%	15%	40%	45%	0%
Tablet	0%	5%	35%	60%	0%
Mythware	0%	15%	25%	60%	0%
OER	5%	5%	40%	50%	0%
Digital Book	0%	15%	45%	40%	0%

About pupils' interest for the use of technological resources in the classroom, eighth-grade students take an opinion clearly opposite to that of second and fifth year students. Except for the interactive whiteboard, there is a higher percentage of students who do not like or like a little to use the mentioned resources than the one that likes to use them effectively: tablet, 68% (15 students); Mythware software, 81% (18 students); OER, 63% (14 students); digital book, 73% (16 students) (Table 3).

Table 3. Interest of Students (8th grade) for the Use of Technological Resources

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	9%	32%	45%	9%	5%
Tablet	23%	45%	23%	9%	0%
Mythware	36%	45%	14%	5%	0%
OER	36%	27%	36%	0%	0%
Digital Book	23%	50%	23%	5%	0%

In addition, in what concerns their like using technological resources (Table 1), the second grade students claim not to have difficulties in handling and operation. There is only 5% of the students (1 student) that claims to have a lot of difficulties in using the software Mythware (Table 4).

Table 4. Difficulties of Use of Technological Resources by Students (2nd grade)

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	95%	5%	0%	0%	0%
Magalhães	95%	5%	0%	0%	0%
Mythware	74%	21%	5%	0%	0%
OER	100%	0%	0%	0%	0%
Digital Book	84%	16%	0%	0%	0%

At the fifth grade level, it can be said that the majority of students does not present significant difficulties in the use of those resources. It turns out that it is in tablet (15%) and in the digital book (20%) that students refer to have more difficulties, values that correspond to three and four students, respectively (Table 5).

Table 5. Difficulties of Use of Technological Resources by Students (5th grade)

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	65%	25%	5%	5%	0%
Tablet	65%	20%	10%	5%	0%
Mythware	70%	20%	5%	5%	0%
OER	55%	35%	5%	5%	0%
Digital Book	55%	25%	10%	10%	0%

The comparative analysis between tables 1 and 4, concerning the second grade, and tables 2 and 5, for the fifth year, could allow inferring that there is a relationship between the difficulties in the use of resources and the interest/pleasure that students demonstrate for their use in an educational context. Relating these tables, the smaller the students' difficulties in the exploitation of resources, the greater the interest is. However, no correlation tests have been made that prove a direct relationship.

With regard to the eighth grade, although most students refer not to feel difficulties in the use of different resources, there are a significant number of students who manifest an opposite opinion. We highlight, for example, the interactive whiteboard and the digital book, where 27% of students (6 students) refer to feel difficulties (Table 6).

Table 6. Difficulties of Use of Technological Resources by Students (8th grade)

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	32%	32%	27%	0%	9%
Tablet	41%	36%	18%	5%	0%
Mythware	45%	36%	18%	0%	0%
OER	41%	32%	23%	0%	5%
Digital Book	41%	32%	23%	5%	0%

With regard to the contribution of technologies for learning, the second-grade students refer that they learn better

when they use different resources in the classroom. There are only 5% of the students (1 student) who claims that the software Mythware has a little contribution to improve his/her learning experience (Table 7).

Table 7. Contribution of Resources to Improve Students' Learning (2nd grade)

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	0%	0%	21%	79%	0%
Magalhães	0%	0%	16%	84%	0%
Mythware	0%	5%	42%	53%	0%
OER	0%	0%	11%	89%	0%
Digital Book	0%	0%	5%	95%	0%

In this context, at the fifth-grade level, it is observed that the majority of students believe that technology has a positive impact on their learning, since they contribute to learn better. However, the results are not as positive as in the second grade, since a higher percentage of students refers that these resources contribute little or nothing to improve learning. It is noted that 30% of students (6 students) considered that the interactive whiteboard contributes little to the improvement of their learning, as well as 5% (1 student) has the same opinion regarding the tablet, 10% (2 students) in relation to the Mythware software and 25% (5 students) to the digital book and the OER. We should also stress the fact that 5% of the students (1 student) consider that the OER didn't contribute to a "better learning" (Table 8).

Table 8. Contribution of Resources to Improve Students' Learning (5th grade)

	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	0%	30%	45%	25%	0%
Tablet	0%	5%	45%	50%	0%
Mythware	0%	10%	45%	45%	0%
OER	5%	25%	40%	30%	0%
Digital Book	0%	25%	40%	35%	0%

Eighth-grade students don't consider the impact of learning technologies to be so positive. For all the resources analyzed, most students stated that they contribute little or nothing to improve their learning. In this sense, it is found that only 27% of students (6 students) considered that the interactive whiteboard and the tablet contribute a lot on improving the learning, 18% (4 students) have the same opinion regarding the Mythware software and 23% (5 students) regarding the OER and the digital book (Table 9).

Table 9. Contribution of Resources to Improve Students' Learning (8th grade)

|	Nothing	Little	Very much	Totally	I don't know
Interactive Whiteboard	18%	50%	27%	0%	5%
Tablet	27%	45%	27%	0%	0%
Mythware	27%	50%	18%	5%	0%
OER	41%	36%	23%	0%	0%
Digital Book	32%	41%	23%	5%	0%

Tables 1, 2 and 3 show that, as they advance in their schooling, students demonstrate less willing and interest for the use of technological resources in the classroom. Also in tables 7, 8 and 9 it is noted that the more advanced the grade, the lower the percentage of students who believes that technologies contribute positively to the improvement of their learning. Therefore, it can be thought that there is a cause-and-effect relationship between them: no pleasure/interest in using a particular resource because this does not contribute to learning improvement. However, no one can safely say that this cause-effect relationship really happens because it was not possible to assess whether students who are less interested in the use of technology are those who consider that they contribute less to their learning.

When faced up to about their preference between the use of books in digital version or paper, 68% of students (13 students) of second grade state that they prefer the digital book (Figure 2). The reasons that lead to this preference are related to the fact that the digital book is, accordingly to students, more pleasant and funny and allow teaching and learning through games and other tools. On the other hand, 32% of students (6 students) (Figure 2) states that they prefer the book on paper because you can add notes manually.
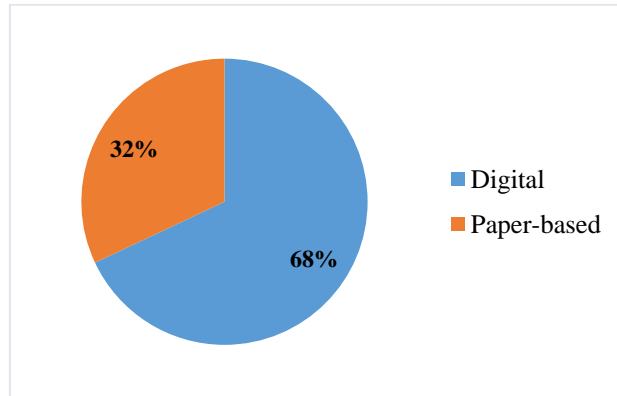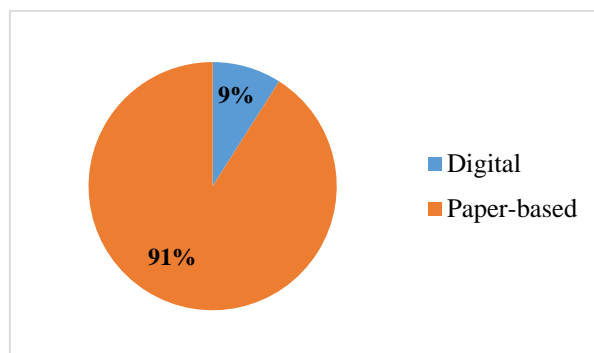
Figure 2. Digital Book *versus* Paper-based Book (2nd grade)

Similarly, 60% of students (12 students) of the fifth-grade state they prefer the digital book, against 40% (8 students) who prefer the book on paper (Figure 3). Among the reasons mentioned by students to prefer the digital book, it is highlighted the fact that it allows to access to a wide range of resources, is more fun and make students carry less weight, since a tablet has digital books for different subjects. On the other hand, students stress that the book on paper "works every time" and does not present technical problems, lets them add handwritten notes and does not prevent accessing multiple resources simultaneously, for example, book and schedule of activities.
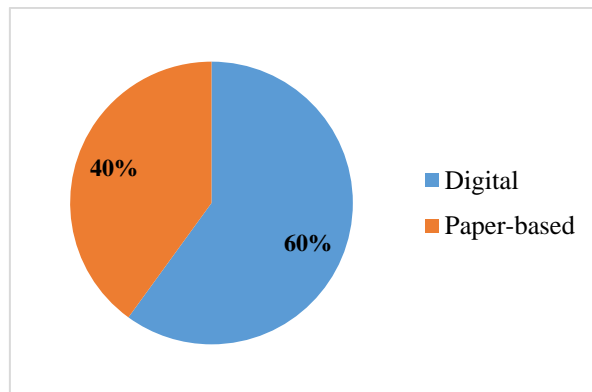
Figure 3. Digital Book *versus* Paper-based Book (5th grade)

The views of eighth grade students are not as favorable to the use of the digital book: 9% (2 students) prefer the digital book while 91% (20 students) like to use the book on paper (Figure 4). More than half of the students points to the absence of technical problems associated with tablet exploitation of the digital book as a reason to prefer the paper-based book.

Figure 4. Digital Book *versus* Paper-based Book (8th grade)

The placement of students in the fifth and eighth grade stated on figures 3 and 4, also reflected their opinion on the relevance of the tablet for the home study. While 75% of students (15 students) of the fifth grade believe that they study better with the tablet at home than without it, just 32% (7 students) of the eighth grade expresses the same opinion (Figure 5). The reasons pointed out by fifth grade students meet those that had already been

mentioned when asked whether they prefer digital or paper book. Some students point out that the use of the tablet at home allows them to study using more applications and using files sent by teachers through the Mythware software, for example. On the other hand, without the tablet, which implies the existence of paper books, students consider, again, that it's easier to access multiple resources simultaneously, such as books and workbooks. Access to more features, for example, through Internet is one of the most cited reasons for eighth grade students and that value that they can take advantage of the tablet at home. However, the students return to express the opinion that without the tablet there are less technical failures and a book on paper is easier to use and allows adding handwritten notes. There is also a student who states that without tablet there is less distraction when studying.
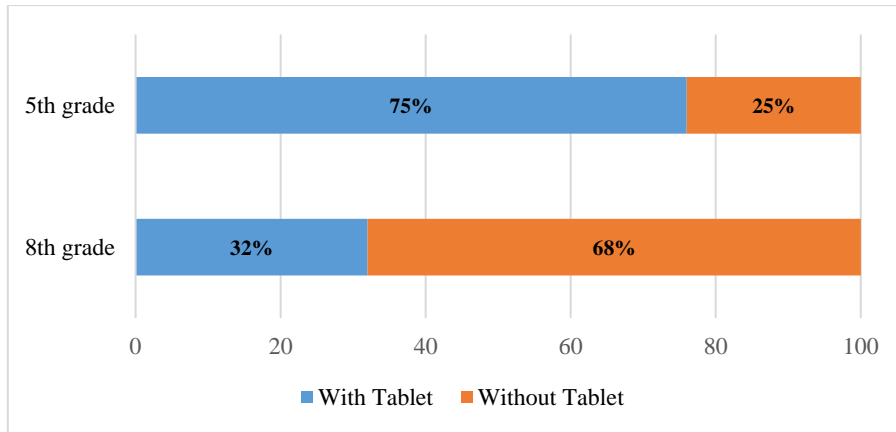
Figure 5. Preference of Students (5th and 8th grades) to Study at Home

The EduLab model assumes the adoption of innovative performance formats, leading benefits for the teaching and the learning process, through an integrated educational and motivating use of technologies. When asked about the changes that have taken place in the development of the class with the integration of technologies, some second-year students state that they started accessing a greater diversity of resources, which made the lessons more fun. They suggest using more games and other digital resources and all of them have shown interest in continuing to integrate the project in the next school year (Figure 6).

Fifth grade level students also value the fact of having access to a greater diversity of digital resources, which, in the opinion of some, facilitates learning and creates more funny lessons. If, on the one hand, there are students who mention that the integration of these technologies has led to more attention in class, some people also consider that it contributes to more distraction. Students of the fifth grade suggest that further research needs to be carried out using these resources and 85% (17 students) means that they would like to continue to integrate the project in the next school year (Figure 6).

Related to what has been presented concerning the lack of eighth-grade students in other parameters, in this field it is also highlighted the fact that most students of this year of education consider that the integration of these technologies, due to frequent technical problems led to a large number of "lost" classes. On the other hand, there is a small number of students who believes that these technologies promote the implementation of more interesting and fun classes and stimulate the students' attention. In this sense, only 18% of students (4 students) reveals that they would like to join the EduLabs project in the next school year (Figure 6).
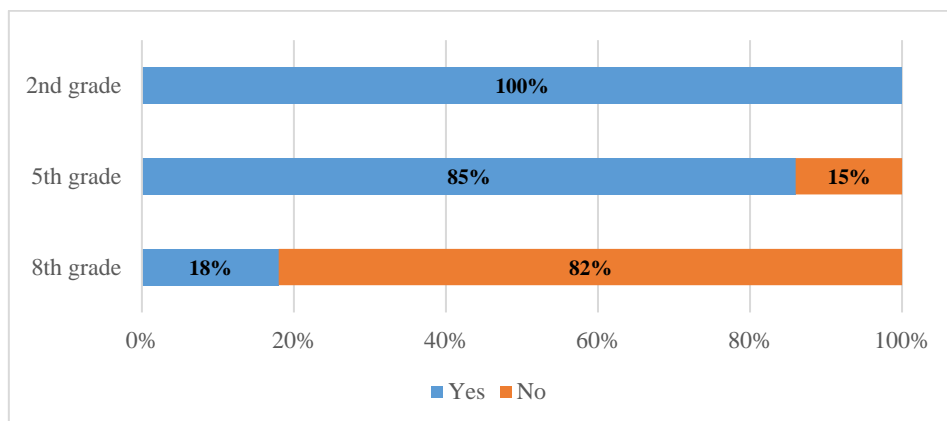

Figure 6. Students' Interest in Integrating the EduLabs Project Next Year

**The impact of the EduLab model on the learning process: the perception of teachers**

The results presented here focus on the perception of teachers on the impact of the EduLab model on students' learning, especially in their attitudes and skills development.

The answers submitted by 11 teachers in the survey allow affirming that they consider that the technology has a positive impact on students' attitudes. All teachers involved agree that technologies motivate students, encourage class participation and promote a more autonomous learning (Figure 7). There is still a large proportion of respondents (91%, which corresponds to 10 teachers) who claims that technologies are of great interest to students, and the teacher who has not expressed an opinion in this regard, indicated not having an opinion (Figure 7). Regarding attention and concentration, 73% of the teachers (8 teachers) agree that technologies contribute to stimulate these cognitive processes, while 18% (2 teachers) disagrees and 9% (1 teacher) claims not to have an opinion in this regard (Figure 7).
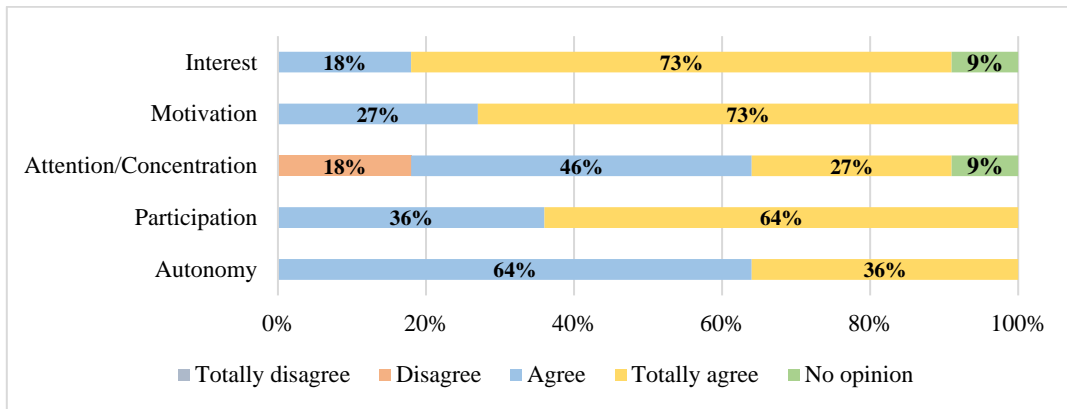

Figure 7. Impact of Technologies on the Attitudes of Students

Regarding students' skills development, teachers are unanimous in saying that the technologies support the development of specific disciplinary skills and 91% (10 teachers) considers that also the writing and reading skills can be developed by using the technologies (Figure 8). To the level of social skills, it turns out that all the teachers argue that technologies promote the interaction between students and 91% (10 teachers) states that these tools encourage students to collaborate among themselves (Figure 8). It is also stressed that 82% of the teaching staff (9 teachers) believes that technologies foster the development of students' critical thinking and communication skills (Figure 8).
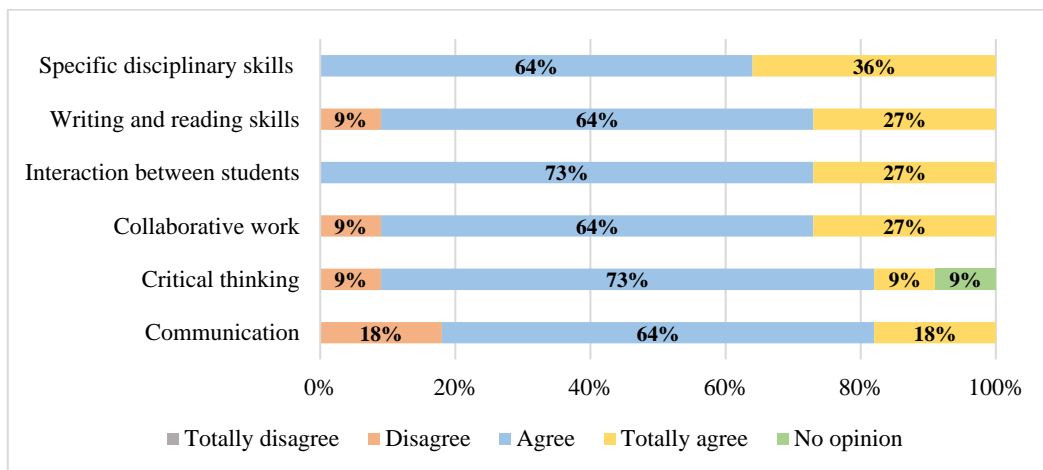
Figure 8. Skills Developed with Technologies

All the teachers consider that technologies allow to develop the "learning to learn" skill and promote a student-centered learning (Figure 9). However, 18% of the teachers (2 teachers) disagree with the fact that technologies help students to learn more effectively (Figure 9).
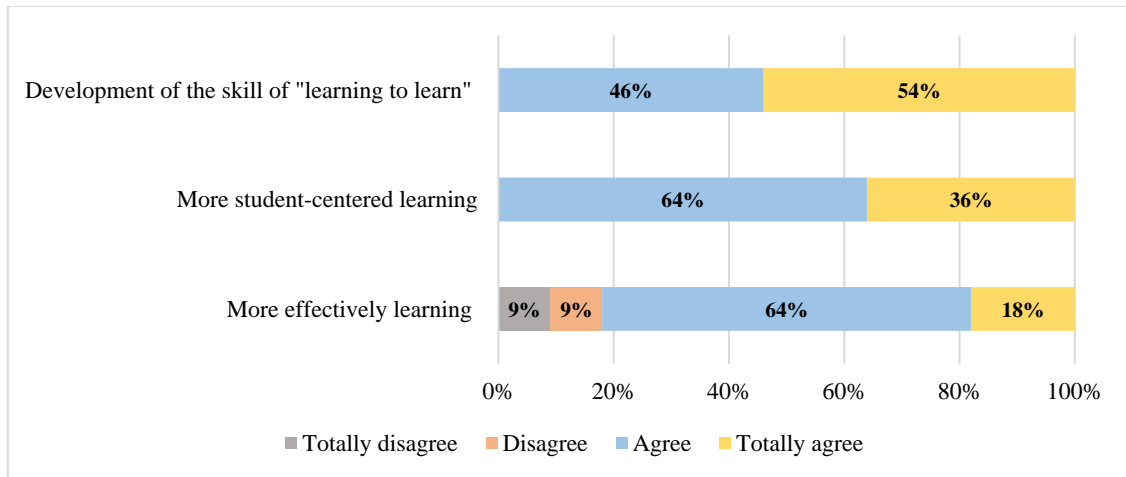
Figure 9. Contribution of Technologies for Learning

Moreover, as shown in figure 9, all teachers disagree the fact that technologies make students more passive in their learning process. However, when asked if the technologies can mitigate the difficulties of the students, the teachers are not unanimous: 36% (4 teachers) disagree; 55% (6 teachers) agree; and 9% (1 teacher) has no opinion on whether the technology effectively mitigates students' difficulties.

CONCLUSION

Through the integration of technologies in the educational process and teachers' training and monitoring, the EduLab model aims to make the educational process more dynamic and motivating and to promote the development of skills of all students and teachers involved in. In this paper, it was intended, by means of surveys, to evaluate the impact of the EduLab model in the learning process, collecting the opinions of students and teachers.

At the level of students' perceptions on the contribution of the integration of technologies in their learning process, it is observed that the considerations of younger students (second and fifth grades) differ from those of the older students (eighth grade level). While second and fifth grades students express interest in the use of technologies and consider that these contribute to learn better, eighth-grade students are not so interested and consider that technologies have a little contribution to their learning process.

The evident difference at the level of different grades students' perceptions, reflected also in students' preference for the use of books in digital form or paper. On the one hand, second and fifth grade students refer they prefer the digital books because they consider them to be more fun and allow a greater diversity of resources, accordingly to the results obtained by Clarke in his study of 2012. On the other hand, eighth-grade students claim to prefer using the paper book and point technical problems as the main reason for the manifestation of this preference.

It is important to ensure that students' perceptions and, consequently, the success of the project, does not depend on technical issues and, to this end, it is essential that will be taken into account the guidelines laid down by Bannister, Balanskat and Engelhardt (2013). Despite the differences, both groups consider not having difficulties in using these resources. Also, the study of Lewin and McNicol (2014) refers to a very significant number of students considered to be confident in the use of technologies.

It should be noted that in several items of the questionnaire, students highlight the low weight, the playful and practical character and diversity of applications such as a plus in the use of the tablets, which corroborates the benefits singled out by Lanzi, Ferneda and Vidotti (2011).

The way the EduLabs project was designed for AEGN includes ownership of the tablet and that is based on the adoption-diffusion model, proposed by Howard and Rennie (2013). The fact that students can take advantage of the tablet outside school, in informal learning environments or non-formal, is in accordance of Balanskat (2013). In this sense, a considerable number of fifth grade students (75%) believes that they study better with the tablet at home than without it. However, only 32% of eighth grades recognize the importance of the tablet for home study. This consideration meets the study implemented by Clarke (2012), where teachers reported that younger students recognize more benefits in using the tablet in the learning process. This result may be related to the fact that older students have already developed other methods and study skills without using the tablet. Moreover, it can be

observed that these students have their own mobile phones more powerful than the provided tablets, which might cause them some discouragement in using them for learning.

In general, the perceptions of the teachers involved reflect the recognition of the positive impact of the integration of learning technologies, especially at the level of motivation, class participation and autonomy, which meets the potential referred to by Balanskat, Blamire and Kefala (2006), presented in the introduction to this article. Most of the teachers (91%) believe that the technologies are of great interest to students, perception that goes against that revealed by eighth-grade students.

Most teachers from AEGN agree that technologies foster the development of 21st century skills (Schrum, & Levin, 2009) as critical thinking (82%), collaboration (91%) and the students' communication skills (82%), as did the study of Lewin and McNicol (2014). All the teachers consider that technologies allow to develop the competence of "learning to learn" and promote a more students focused learning. However, not everyone agrees that the technologies make the students learn more effectively. Also in the study of Balanskat (2013), the teachers were unanimous in recognizing a very positive impact on students' learning.

RECOMMENDATIONS

In terms of future work, it would be interesting to know the students' perceptions in more detail, looking to find out what is their perspective on the impact of technologies integration in their learning process, in terms of their attitudes (e.g., motivation, interest, participation and autonomy) as well as the skills that may be developed (such as critical thinking, creativity, communication, collaboration, among others). On the other hand, it is suggested that it should be understood the existing inequality in terms of different grades students' perceptions.

It is further considered that it constituted an advantage to know parents' perceptions about integration technology contribution to the learning of their children.

It would also be interesting to implement EduLab model with other classes and other schools and take the project off the Portuguese context, testing it in other countries.

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