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Preface

This volume contains papers presented at 2019 5th International Conference on Education and Training Technologies (ICETT 2019), which was held in Seoul, South Korea during May 27-29, 2019.

ICETT provides a scientific platform for both local and international scientists, engineers and technologists who work in all aspects of E-education and Education. The volume includes 32 selected papers which were submitted to the conference from universities, research institutes and industries. These papers cover the topics range from Educational Research and Practice, Special Education, E-Learning and Information Technology and Education. Each contributed paper has gone through a rigorous blind peer-review process. The proceedings tend to present to the readers the newest researches’ results and findings in the related fields.

We have invited Prof. NG Shun-Wing, University of Saint Joseph, Macau, to give a keynote speech, entitled “Teacher Balkanization: Does Leadership Matter?”; Prof. Yixun Shi, Bloomsburg University of Pennsylvania, USA for “Strategies in Teaching College General Education Mathematics Classes”; and Prof. Tang Siew Fun, for “Disruptive Innovation and Digital Shift in Learning and Teaching”. It’s really appreciated for their excellent speeches and great contributions to this conference.

Meanwhile, we sincerely thank the contributions made by session chairs and reviewers. The chairperson of each session played an important role in guiding the sessions in a timely and efficient manner. The success of this conference cannot be done without the reviewers, who volunteered their time in helping select high quality papers and provided invaluable constructive criticism to improve these papers.

We truly believe that the participants will find the discussion fruitful and enjoy the opportunity for setting up future collaborations.

Best Regards

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Prof. NG Shun-Wing, University of Saint Joseph, Macau
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Tablets in School: What are the Impacts on Student with a Learning Disability?

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ABSTRACT

At a time when new technologies are increasingly present in society, it is important to scrutinize the benefits and challenges of their use in school settings. The purpose of this paper is to examine how tablets can contribute to the academic success of students in so-called special education. We present the findings of a study of 54 students in the province of Québec with a learning disability that identifies the benefits of using tablets—more specifically, iPads—in a special education context. The paper also addresses the challenges that students and teachers alike must overcome.

CCS Concepts

• Human-centered computing → Human computer interaction (HCI) → Interaction devices → Touch screens.

Keywords

Tablets, technology, digital, learning, school, teaching, mobility.

1. INTRODUCTION

At a time when new technologies are increasingly present in society and even represent the future of education (OCDE, 2015)[21], it is important to scrutinize the benefits and challenges of their use in school settings. Now that the Internet is ubiquitous and social networks have overrun our private and even professional lives, more and more studies on the effects of introducing technology to the classroom are being published and are increasingly vital. Although some critique technology use in schools because they fear the decline of conventional interpersonal relations (Mouisset-Lacan, 2012)[19], much research has highlighted their potential in education. In fact, it is critical to identify the challenges associated with their integration and, in particular, the learning they can foster through appropriate, thoughtful use with a focus on developing certain “key” competencies for the learners of today and tomorrow. This paper is intended as a review of how tablets are used and how this use affects secondary-level special education teaching; it also proposes to identify certain benefits and challenges associated with such use. Indeed, although tablets have been used in schools for a number of years, with more or less success depending on the educational institution, they continue to face major challenges in terms of education and adaptation to the school setting. This article will review what is currently being said in research on the use of tablets in school and will present the conclusions of a study conducted with students identified as having a learning disability. Although incorporating this technology in schools remains a sizable challenge, readers will see it can be used very effectively, including with special education students. Numerous benefits are associated with tablet use in schools, particularly as regards certain competencies that the curriculum seeks to develop as well as aspects related to the occupational context and to the learners’ social relations. Finally, the benefits may certainly facilitate these young people's integration into the job market and thus positively impact their future in society.

2. TABLETS IN SCHOOL

In only a few years, tablets appear to have elicited an enthusiasm never before seen in primary and secondary schools around the world. Because the tool has only recently been introduced to schools, scientific literature on tablet use and impacts is relatively young, but also on the rise. In France, for example, tablets emerged in classrooms beginning in 2010 (Bernard, Boulec'H, & Achard, 2013), when the Ministry of National Education launched experiments at various schools. Thus, in the beginning, they were introduced to the classroom in an experimental capacity. The work by Bernard, Boulec’H and Achard (2013)[1] highlights the fact that students were able to manipulate the tablets easily and intuitively as well as the potential for enhanced, contributory interpersonal exchanges among the students.

Several advantages were identified in terms of tablet use, for example, increased motivation among students (Kinash, Brand, & Mathew, 2012)[14] and, for the teacher, the possibility of shaking up teaching strategies (Fernández-López, Rodríguez-Fórtiz, Rodríguez-Almendros, & Martínez-Segura, 2013)[4]. McClanahan et al. (2012)[16] studied the introduction of a tutoring device in a reading course for a student diagnosed with attention deficit and hyperactivity. Their research shows that tablets facilitate students’ individualized learning, develop their reading skills, and have the potential to increase their confidence. The use of iPads in class also enhances communication and cooperation among students (Henderson & Yeow, 2012)[7] and, through manipulation of the device, their computer skills (Killilea, 2012)[13]. However, it should be kept in mind that using such mobile tools can also be a source of distraction for the students, as Duncan (2012)[3] reminds us, and that they must be used thoughtfully and coherently.

With the use of tablets becoming mandatory in certain countries, Villemontex et al. (2015)[24] prepared a report (ExTaTE) on the use of these devices at primary-school level. Conducted at eight schools in eight different administrative regions of France, this project showed that tablets offer, in particular, a “whole range of
resources that can help students become autonomous in their digital writing practice” (Ibid., page 73). Researchers also showed that these tools allow for “spontaneous cooperation” (Ibid., page 74) on account of their portability and compact size. Another advantage identified is the possibility of combining verbal and written information, or text and images, and thus to “change the relationship to writing in schools” (Ibid., page 74) and offer teachers new educational options. These teachers were observed to have developed “occasionally unusual professional approaches” (Ibid., page 76), such as sharing applications or access to online services.

In the province of Québec, Canada, Karsenti and Fievez (2013) studied the use of tablets (iPads) in the classroom. The study looked at 6,057 students and 302 teachers in the province and showed the use of iPads in class led to “increased motivation among students” as well as better “access to information.” Moreover, the findings show that tablets benefit from an “astonishing cognitive potential,” even if teachers, for the time being, remain “ill-prepared” and the integration of these tools remains a real “challenge” (Ibid., p. 1). The authors recommend that teacher training be emphasized when it comes to the use of these tools and, for the students, a “heightened awareness regarding well-considered educational and scholastic uses” (Ibid., page 1).

Some authors have focused on students with a learning disability, as is the case with Chai, Vail & Ayres (2015)[2], who examined the impact of tablets on students with a learning disability or a developmental delay, but also Kagohara et al. (2013)[9], who conducted a literature review that highlighted the educational contribution of iPads and iPads for this particular type of student. Can tablets support students with certain learning disabilities? According to the research by Heitz (2015)[6], the answer to this question appears to be positive. The author presents the findings of research conducted on the Clis’Tab experiment, a project that probed the pedagogical interest of tablets for students with an impairment (mental and cognitive disorder, autism, speech-language disorder). The research involved 95 students, the average age of which was nine, and identified numerous benefits for the students: “through a change in their relationship to learning, through appropriation of verbal and written language skills, through a change in interactions within groups, and through the evolving place of the students within the school.” However, a number of challenges had to be overcome, especially from a technical perspective.

3. OBJECTIVES

Tablets are tools that can be used to stimulate student motivation, cooperation, writing skills, and so on. But in the 21st century, tablets are also truly creative, emancipatory tools for students. Is this really possible with secondary-level students with a learning disability? We have seen that certain studies show these students are also likely to benefit from the advantages and educational opportunities of these new tools. But can they help them assert themselves as 21st-century learners? And how can these tools help the students become fully functioning members of society, in order to facilitate their integration into the job market?

Our main research objective, articulated around these questions, was to better understand the use of iPads by students with a learning disability as well as by their teachers, and in so doing identify the benefits and challenges associated with such scholastic use. To do so, we carried out our research over a three-year period from 2012 to 2015 in order to extract a range of elements and data from interviews and classroom observations. Why take an interest in students with a learning disability? It is of critical importance to propose innovative and effective educational solutions for this population in order to strengthen their ties to the school setting, an environment that they all too often dread, and even flee. Yet these young people are the very future of society and facilitating their integration into the job market depends on support for their education and social emancipation.

It should also be remembered that a tablet per se is not educational—it’s educational nature depends on the use that teachers and students make of it. Furthermore, our project focuses more on how students and teachers feel about and what they do with iPads rather than on the technical potential of the tool itself.

4. METHOD

This section describes the methodology applied to our research. It presents the number of participants as well as the data collection and analysis methods. Following this chapter, research results will be presented.

4.1 Participants

The school at which we conducted our research is located in the province of Québec, Canada. It is a business-based training centre (Centre de Formation en Entreprise et Récupération, or CFER) that follows a formula introduced in 1990 as an adapted alternative that enables any student with a learning disability to obtain a qualification diploma. The purpose of this type of centre is, by training young learners, to change everyone’s mentality on the environment by applying recovery and recycling measures. These centres are for teens aged 15 to 18 who are unable to pursue higher education. These schools-cum-businesses allow young people to benefit from adapted supervision with particular emphasis on every individual’s discipline, respect, effort, and engagement.

What sets CFER students apart is that they are especially resistant to school settings, educational standards, school forms and, therefore, any learning that may happen there. Yet these are the elements that informed our decision to focus on the students, for whom the risk of an increased digital and social divide remains—and may even worsen. These young people are very often “underprivileged” and will have more difficulty than others finding fulfilment and an occupation and even adapting to the constraints of our digital age. The hope is that guiding these students to use technology and introducing them to computer issues and to content digitization may diminish the chasm separating them from the “technologically affluent,” for whom ownership of the latest technology is the baseline rather than a luxury.

Thirty-four students at this school took part in this research project, as did five of their teachers and the school principal. For information purposes, the average age of these students was 16.

A specific tool, the iPad, was selected for this study on the use of technology in education. Why was this device selected, in particular? Simply because it is the mobile tool most used in schools, across all continents, at the time when the research was conducted. In 2013, the iPad accounted for 75% of the world’s scholastic market for tablets (Khaddage, 2013)[12] and 90% of that market in Canada (Karsenti & Fievez, 2013)[10]. Further, the iPad is associated with a growing number of applications, 75,000 of which were education-related in 2017. This makes the device an active, key player of the digital trend in pedagogy.
4.2 Data Collection
In the course of this research, three main data collection instruments were used.

These are:
- Semi-structured group interviews with students (n=6)
- Group meetings with teachers (n=3)
- Video-recorded observations in the classroom (n=5 with 60-minute recording periods)

The group interviews were intended to provide a better understanding of how tablets were being used as well as the benefits and challenges of incorporating their use in the classroom for students with a learning disability. As such, the interviews were an opportunity to hear the views of all participants. In contrast, the data collected from the video-recorded observations in the classroom enabled us to better understand some of the benefits mentioned by students and teachers.

4.3 Data Analysis Method
The qualitative data were analyzed based on the processes developed by L’Ecuy (1990) and Hubert and Miles (1991, 1994) using a content analysis approach. QDA Miner, a popular software program for analyzing qualitative research data (Fielding, 2012; Karsenti, Komis, Depover, & Collin, 2011), was used.

5. FINDINGS: BENEFITS AND CHALLENGES OF TABLET INTEGRATION

Our goal was to improve our understanding of how iPads are used in the classroom at the CFER and of the challenges associated with integrating and using the devices in that setting. Our study identified no less than 40 benefits to tablet use, as well as five key challenges that must be overcome to optimize educational use.

For an orderly presentation, the benefits have been classified by their pedagogical category. Thus, there are positive effects for the students in three regards: on their rapport with school and their classroom behaviour; on the learning outcomes targeted by the curriculum and their academic performance; and on the students’ job market and social integration. The categories are described in the following sections.

5.1 A Positive Impact on The Student’S Rapport with School and Classroom Behaviour

Our findings show that among students at the CFER, iPad use enhances academic motivation. Using iPads in the classroom was a motivating factor for the students, an especially important factor for students with a learning disability who are at greater risk of disinterest in school. What’s more, when these students used an iPad, their self-esteem was enhanced and they felt prouder of what they were accomplishing at school. Use of the device increased students’ skills and competencies and improved school attendance as well as their retention.

The latter points are particularly important to the extent that such students tend to be detached and in conflict with school as an institution and, by extension, with their school. They have problems finding the motivation to attend class and to invest effort in their schoolwork. Their autonomy was shown to increase with the use of iPads, in particular because the device enables them to work at their own pace.

Finally, it appears that the students developed a strong sense of belonging at their school through their enjoyment in using this tool and the pride of being part of a school where digital technology is considered a learning mechanism rather than taboo.

5.2 A Positive Impact on Learning and Academic Performance

In terms of the students’ learning, the study found that using iPads fostered academic success, depending on the context, and enabled the students to learn more at school. In addition, the teachers were able to make their teachings more meaningful thanks to the iPads, notably through concrete manipulation of applications or the immediate results this tool yields.

For students, beyond the development of their computer skills, we also identified an enhanced ability to communicate in writing and verbally as well as improved reading skills. In fact, the use of tablets requires the learner to read and write (e.g., for composition or information research), but also stimulates the development of the students’ verbal language and communication thanks to the necessary exchanges between students and teachers as well as among students when the iPad is being used.

Also in regard to this learning, it was found that using an iPad gives the students an opportunity to develop their Internet research skills both in French and in a second language (in this case, in English). But the benefits don’t end there. It turns out that using an iPad also enhances general skills in mathematics, history, and geography, but also in video use for the more creative aspects. Further, augmented abilities in terms of problem-solving were also seen. Thus, based on how the students used the device, there are a range of benefits similar to those expected at school. It all depends on how the iPad is used to encourage students to develop their academic skills.

The Internet connection needed to search for information on every subject gives users a chance to develop research and problem-solving skills. In fact, when they are asked at this school to participate in a given activity, and even to carry out practical work, the students are now able to conduct Internet research at anytime, anywhere in school, thanks to the use of tablets in the classroom. Also, whether they are in class or in the shop, students are able to quickly find an online solution to a problem. The only constraint here: access to a permanent Internet connection authorized by the school board, which was the case for the CFER visited as part of this research.

Finally, more generally, it appears that an iPad allows students to produce better quality presentations or assignments and create more attractive schoolwork, all the while working more quickly and efficiently. Using an iPad is thus conducive to students developing their full potential at school.

5.3 A Positive Impact on The Student’s Future Job Market Integration

But the effect of iPad use appears to extend beyond the classroom environment. Its potentialities extend as far as the job market, where the students’ integration is facilitated. In addition, it was found that by using an iPad, the students were able to make more connections between what they were learning in school and their occupational aspirations. It is easier for them to see how what they are learning will serve them later. The study also shows that,
depending on the context, communication during their practicum was facilitated with the teachers. The students were able to communicate more easily with their teachers, a fact that no doubt contributed to greater attendance for the practicum. They also appeared to be more organized and certainly developed a range of skills that will be useful to them in the job market. Use of an iPad enabled them to become better acquainted with their talents and aptitudes and to even develop their creativity.

5.4 A Positive Impact on Social Integration

Collateral learning associated with iPad use also includes significant impact on the students' social skills. They are better able to understand the world around them, develop their critical thinking, depending on their level, and be better prepared for the 21st century and our technological society. In fact, with new technologies increasingly present in our day-to-day lives, it seems particularly important for the students to be continuously in contact with them, know how to use them, and—especially—be able to participate in the digital world of today and tomorrow as true contributors. In addition, and for the purpose of understanding the world in which the students are evolving, iPads are a way for them to regularly and frequently access the information published on the Internet, as a result of which they are more interested in reading the news and in doing so more often. Finally, we saw that the students’ collaborative skills grew, enabling them to grow more and exchange with others.

6. THE REMAINING CHALLENGES

Our research, conducted at a CFER, associates iPad use in the classroom with numerous positive benefits in terms of student behaviour. These benefits are of different orders. There are positive effects on student behaviour and their rapport with school, their learning, and their academic performance, as well as their social and job market integration. Nonetheless, certain challenges remain to be overcome for teachers as well as students.

For teachers, managing a classroom with iPads may present a degree of difficulty. This is accentuated by the fact that students in their first year of training at the CFER were found to have more limited device use. In addition, during practicums, iPad use is sometimes a challenge, notably associated with the location of the practicum. Classroom use of iPads also requires a substantial time commitment for teachers who are sometimes collateral victims of a poor Internet connection or some other technical constraint. Unfortunately, this may occur in many school settings.

7. DISCUSSION

Although much in our society has changed with the advent of technology (Livingstone, 2012)[15], technological advancements are often associated with real advantages in the field of education (Jouneau-Sion & Touzé, 2012)[8]. This research showed that the advantages are not reserved for “conventional” students alone, but can also apply to a certain number of students with a learning disability. Our research process involved monitoring the use of tablets (i.e., iPads) at a CFER over several years. Apart from the social and motivational aspects of tablet use, it appears that certain learning outcomes targeted by the educational institution’s curriculum are advanced (e.g., writing, reading, math, and, in certain cases, history). It would be interesting to repeat the experiment with another student population without a disability, even though the study is based on three years of observations and led to sound, reliable findings.

Given that digital technologies are and will be increasingly present in society, it is a major challenge for schools to use these tools (Underwood & Dillon, 2011)[23] for facilitated integration and learning, regardless of the context. For example, a recent report by the Ontario Public Service titled “21st Century Competencies” (Ontario Public Service, 2016)[20] addresses the matter of competencies in this century in our “changing world.” It states that problem-solving competencies, for example, are part of the “key indicators for success” and that today’s employers are looking for teamwork and communication skills (Ouellet & Hart, 2013)[22], elements that can be developed, as we have seen, through the use of iPads in the classroom. Furthermore, the study paper advocates the use of digital tools like tablets, in particular, to develop learner mobility and accountability in every situation.

The main challenge involving the use of iPads in the classroom concerns teacher training and their mastery of these tools. What’s more—and this is certainly the most substantial challenge today—it would appear to be particularly important to consider teacher training on how to use digital tools, more specifically tablets, in a school setting. According to our study’s findings, another major challenge is to provide students with an education they can use in order to ensure they do not become lost in digital meandering, especially when on practicums outside the school environment. Here again, at issue is supervision and preparation for tablet use in the occupational sphere, which must be redefined or overseen differently.

8. CONCLUSION

Our goal was to determine the main benefits and challenges associated with frequent, regular use of an iPad in a school setting. To do so, we conducted group interviews with students and teachers at a business-based training centre (Centre de Formation en Entreprise et Récupération, or CFER) and video-recorded observations throughout the project. The study, conducted over a period of three years, showed that iPad use yields numerous benefits identified by teachers and students alike. These benefits concern students’ rapport with school, their learning, and the development of social and occupational skills. In the end, some 40 benefits were identified. However, the data collected also revealed certain challenges for both students and teachers, such as the investment and technical problems to be factored in. Note that it is how the iPad is used, not the device itself, that makes these numerous benefits possible for learners and their teachers. Finally, it should be noted that whatever is beneficial for these students, who had been failing in school prior to joining this program, also benefits society as a whole and its future. This technology only has a place at such schools if the tools make a concrete and significant contribution, as we saw in this research, to achieving their mission.

In conclusion, we can state that this research demonstrated that iPad use at this type of school entails a great deal of educational potential for those involved, but incorporating these tools involves a certain number of challenges. It also appears that the students and their teachers were, and continue to be, extremely motivated to use and experiment with tablets in the classroom. We are currently conducting another project with tablets at the same school but for coding education this time. The results of that research will also be published as regards the benefits identified by students and teachers.

9. REFERENCES


