Constraints on Developing Digital Literacy Skills in Higher Education

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ARTICLE INFO	ABSTRACT
	The term 'literacy' has been traditionally associated with the ability to use the skills of reading and writing. Nowadays and with the progress of technology, this term has been broadened to refer to other skills and abilities. One of these is digital literacy, which is no longer restricted to the ability to handle computers. It encompasses several skills that teachers and students should master so that effective learning/teaching can take place. Not only does the importance of digital literacy lie in providing and making information more accessible, but it does mainly aim at respecting the tendencies of young learners. A student/ teacher who has not strengthened his/her digital competence will inevitably struggle to succeed in an increasingly digital world. Hence, it should be part and parcel of the curriculum since it contributes to lifelong learning and is a highly required competence for employment. This article is a review of the literature on the beneficial impact of digital literacy and its associated learning outcomes in higher education. It addresses the following questions: What does digital literacy, a powerful technological tool, add to the teaching-learning process in higher education? And what are the obstacles that are likely to hinder the implementation of different digital-related skills?

Introduction

A learning environment, following Goodyear's definition (2001), 'consists of the physical and digital setting in which learners carry out their activities, including all the tools, documents and other artefacts to be found in that setting'. It follows that the use of new technology has become an integral part of our daily life. It is no longer regarded as a facility; rather, it is meant to better prepare students for the growing educational demands of the current era. With a simple click, a message can be delivered by anyone, anywhere, and anytime. In the field of higher education, no one can deny the positive impact of technological tools on teaching, learning, and research. However, the exploitation of this new technology by Moroccan universities is still in the cradle because of the various difficulties and obstacles hindering the learning and teaching process. The aim of this paper is to provide a review of the literature that intends to pinpoint the main obstacles facing the implementation of digital technology in higher education. The identification of these obstacles may encourage teachers to overcome the difficulties they may encounter in integrating and enhancing digital literacy within universities.

As Solomon and Schrum postulate, "[t]he changing nature of information and the new ways our students understand and make sense of the world signal that we need new strategies and new tools for teaching and learning" (2007: 1). Hence, learning to be digitally literate is an essential skill that is not exclusive to a specific field, setting, or level. Therefore, in today's digital world, the question that we should ask is not whether we should teach digital literacy or not, but rather what does digital literacy, a powerful technological tool, bring about to the teaching-learning environment? How can we overcome the obstacles impeding its efficient integration in the teaching-learning process?

What is Digital Literacy?

"Digital literacy" is an umbrella term that includes ICT literacy, media literacy, technology literacy, communications literacy, visual literacy, and information literacy. This does not mean that digital literacy has taken precedence over traditional literacy. On the contrary, both are necessary components for the development of the individual. Therefore, the elaboration of an appropriate definition of this complex term can be baffling.

Digital literacy refers to "the ability to participate in a range of critical and creative practices that involve understanding, sharing, and creating meaning with different kinds of technology and media." (Hague, 2010, p.3) Likewise, Beetham (2010) defines digital literacy as the learner's potential to adjust himself /herself to a digital world via autonomous learning and working. These two definitions focus on the skills that the digitally literate person can acquire and benefit from. These skills include creativity and critical thinking, two highly required competences in the workplace.

According to Martin and Grudziecki (2007), digital literacy can be defined as 'the awareness, attitude and ability of individuals' to use digital tools for communication, expression and social action in specific life situations (p. 251), This definition lays emphasis on the ability of learners to manipulate technological tools to communicate and participate actively in social life. In other words, digital literacy is widely considered an imperative attribute for both academic and professional success. All the definitions mentioned above confirm the benefits that learners can acquire. Let us consider the aim of digital literacy in higher education.

The Organization for Economic Co-operation and Development (OECD, 2013) considers digital literacy, in higher education, "the skill in using digital tools to undertake academic research; writing and critical thinking; as part of personal development planning; and as a way of showcasing achievements" (para. 3). Thus, digital literacy endows students with the ability to underpin academic research, to access, analyze, think critically, and solve problems adequately in a technological era. In other words, higher education students should be able to manipulate digital information effectively and, at the same time, respect the ethical, moral, and legal aspects of sharing information (Bundy, 2004).

That said, to be digitally literate, the students should achieve mastery in three essential competencies (Canada's Center for Digital and Media Literacy (CCDML, 2014)):

Use: refers to the technical fluency and efficiency needed to use the computer at school.

Understand: includes the skills that qualify learners and enable them to comprehend, analyze, and evaluate information by making "informed decisions" about digital media (CCDML). Otherwise, it refers to the intellectual competencies which allow the learners to evaluate digital information and make rational decisions about how to derive benefit from it.

Create: represents the skill to create texts and divulge them via digital tools. It refers to students' ability to create digital texts (music, videos, blogs, written texts, games, and photo sharing.) for different contexts and audiences, synchronize them and disseminate them online (CCDML).

Benefits of Digital literacy

Undoubtedly, technology creates new opportunities for learning that are to be seized and used to facilitate the teaching/learning process and to bridge the gap with the students' expectations and styles of learning dictated by their generation's needs and availabilities. Stockwell (2013:205) expresses this need clearly when he contends that "anything that makes opportunities for learning more accessible to learners must be considered as an enabling aspect," and should be given the necessary heed to facilitate the teaching/learning process and to encourage lifelong learning.

Doing research is an integral part of higher education. In the past, the library was the first resort of the student to look for information, analyze it, and evaluate its relevance to the research topic. Nowadays, twenty-first century students can get different types of information by a simple click. In fact, students no longer complain about the scarcity of references for any topic, thanks to technological advances that facilitates access to articles, books, journals, magazines, and many other resources.

Another advantage of digital literacy is making use of critical thinking, one of the primary 21st-century skills that is likely to be developed since platforms provide various activities that require hard work and challenge. A digitally literate student can use logic and other intellectual criteria to assess information and evaluate its value and relevance. These intellectual faculties include the ability of the student to carefully inspect every piece of information before using or sharing it, as Mc Mahon (2014) notes, a deep understanding, and reasoning, based on the socio-cultural aspects.

Connected to this issue, Cunningham, Harris, Kerr, and McEune (2003) enumerate the benefits of the use of new technology on the teacher, learner, and broader community. As far as the teacher is concerned, this review of the literature has identified three advantages: the positive attitude of teachers vis-a-vis new technology, opportunities to develop courses, and recognition of the teacher's expertise. According to the same study, the impact of the integration of digital literacy in the classroom on the student can be summarized in the following points: motivation and control over learning about autonomy and cooperation.

The wider community can also derive benefits from the new technology on two levels (Cunningham et al., 2003): Parents' help and support of their children and the creation of links between academic environment, local business, and school. The practical implementation of digital literacy is more than the ability to manipulate computers. Digital literacy is related to incorporating essential skills, competencies, and concepts in students' lives, in and out of the university.

Previous research stresses the importance of digital literacy. For example, Yelland (2001) shows that any educational system that does not foster digital literacy and integrate it into the system is not preparing students to be productive in the global world of technology. The European Commission (2003) stressed the same argument and pointed out that:

> "Digital literacy is fast becoming a prerequisite for creativity, innovation, and entrepreneurship, and without it, citizens can neither participate fully in society nor acquire the skills and knowledge necessary to live in the 21st century" (p. 3).

Most importantly, previous research (Bransford, Brown, & Cocking, (2000); Wong, Quek, Divaharan, Peer, &Williams (2006)) concluded that digital literacy is likely to enhance the academic achievement of learners. They also stressed the idea that digital literacy can promote students' knowledge, critical thinking, and cognitive abilities. Teachers, within this framework, will have more time to devote to slow learners (Romeo 2006). It has become imperative to include digital literacy in higher education.

Needless to mention that teachers can improve their teaching methods thanks to digital literacy. They can have access to new teaching material, search for information, keep contact with students and colleagues. The aim is to create a teaching environment in which the learners can develop their learning skills of communication, cooperation, and problem-solving competences.

Obstacles and Recommendations
Incorporating digital technology in the educational system aims at providing students with the necessary skills and competences to live and survive in a digitally oriented world. However, this integration may face some difficulties. A very pertinent study by British Educational Communications and Technology Agency (Becta, 2004) classified

these difficulties as teacher level barriers and school-level barriers. The former includes lack of confidence, insufficient knowledge, resistance to change, and lack of time; whereas, school-level constraints refer to the problems related to the institution: lack of access to resources and lack of training. In addition to obstacles mentioned by Becta (2004), taking into consideration the purpose of this review, we intend to add another category of obstacles related to the central element in the teaching and learning process: the student.

This section aims to outline the obstacles that students, teachers and institutions encounter in the integration of digital literacy in the classroom and provide recommendations to create a healthy teaching and learning technology-based university environment.

Students

No one can deny the impact of digital literacy on students; they are required to use and share digital content, which contributes to enhancing autonomous learning, motivating students, having control over their education, and promoting lifelong learning.

It is generally believed that students can manipulate digital tools better than their teachers; however, their exposure to technology is not enough to make them digitally literate. Many researchers (Brown, Murphy, & Nanny, 2003; Eshet-Alkalai & Chajut, 2010) entertain the idea that without an expert's guidance and help, students will not be able to make adequate classroom presentations, undertake research, avoid plagiarism, develop critical thinking skills, select valuable, authentic information, among other requirements from a university student.

On their way to becoming digitally literate, many obstacles hinder students' ability to improve their digital competencies as advanced learners. These obstacles are identified by Jeffrey, Hegarty, and Oriel (2011) as follows:

> The issue of access and the digital divide that has been of interest to those concerned with social equity continues to generate lively discussion. The students' own beliefs and attitudes toward learning new technology can also become barriers to the students' learning progress when they experience low self-efficacy or anxiety about their ability to develop skills. Conversely, students who are overconfident regarding their technical proficiency can also be hindered in their ability to establish adequate digital information skills. (p 383)

The term 'digital divide' refers to the division that exists between those students who have access to technological tools and those who do not. This lack of access makes some students disadvantaged over their mates. Pedro (2007) stated that the socioeconomic background of students can have a negative impact on their learning when they do not have the necessary material to make progress in a digitally oriented world; whereas, students from a high social class, have access to various technological devices (laptop, mobile, and tablet.) which facilitate their digital learning.

Low self-efficacy, a negative belief about one's own academic achievement, can hinder students' digital learning and their ability to make the necessary progress. Park and Chen (2007) argued that low self-efficacy is intimately related to learners' interest and motivation to improve their skills and attitude to technology. Similarly, Bandura and Cervone (1986) state that low self-efficacy can have a negative impact on students' behavior and future intentions.

Overconfidence is also a barrier to students' technical proficiency. These students overestimate their digital competence and knowledge to the extent that they cannot develop digitally. Students' digital over confidence

inhibits their ability to gauge the quality of information (Manuel, 2002; Brown et al., 2003; Jenson, 2004; Bundy, 2004; Kohut et al., 2010), a fundamental requirement in higher education.

There is strong evidence that anxiety has a harmful effect on learning in general. Tobias (1985) argued that students' focus on their fears instead of their cognitive ability, which influences their learning performance. Bozionelos (2004) postulated that anxiety towards the use of computers can be an obstacle to the use of computers for learning. Both Saade and Kira (2009) and Rosenthal (2010) find out that anxiety, self-efficacy, and low consumption of technological tools are interrelated.

All the obstacles mentioned above can be overcome once students become aware of the importance of digital literacy not only for their education but also for their survival in the workplace. This way, they may get interested in learning its skills and competences. Besides, students should get adequate training in the manipulation of new technologies under the guidance of a teacher and/ or an expert, aware of the students' needs and higher education requirements.

Higher education students should be able to analyze and evaluate information quality. They also should be encouraged to use critical thinking skills to determine the source of the information and its value, as Schoepp (2005) mentions:

> Pupils should be able to decide on which results on the search engines represent original primary source material, and which are comprised of the secondary source material. Whether or not the information has been vetted, fact-checked, and has been published by a verifiable, third-party source are also points which students need to be taught. (p.17)

Likewise, students able to distinguish reliable and original information from faked one are likely to profit better than those who have not developed this competence, especially in arts-related fields. Moreover, nowadays, no one can deny the widespread use of plagiarism among higher education students and its rapid increase besides its dire consequences on the academic achievement of students, which will jeopardize the reliability of the university. For this reason, students ought to check their work against such applications as Turnitin, Writecheck before submitting it for correction. Accordingly, students will be able to determine the quality of their work as original or otherwise and will step away from violating the intellectual property of others. They should be aware that copy and paste is a serious violation and infringement to copyrights. E-Safety Support (ESS) (2013) report stated that

> Respecting copyright and avoiding intellectual property and copyright infringement is a skill that needs to be taught effectively in schools. Copyright infringement has serious consequences, whether it is by stealing photographs via Google for use in projects, to downloading movies or music without paying. (p.4)

Teaching Staff
One of the obstacles that teachers face is lack of confidence. Balanskat, Blamire, and Kefala (2006) find that the teachers' insufficient knowledge of digital tools makes them feel anxious and consequently unable to introduce them into the classroom. This argument is also supported by Becta (2004), who asserts that "many teachers who do not consider themselves skillful in using digital technology feel anxious about using it in front of a class of learners who perhaps know more than they do" (p. 7). This inability to use digital tools in the classroom, always according to Becta (2004), is due to the teachers' belief that their students are more knowledgeable than them. Several studies (Cox, Preston, & Cox, 1999; Pelgrum, 2001; Al-Oteawi, 2002); Balanskat et al., 2006) show that the teachers' lack of confidence can have a negative impact on their motivation to introduce digital technology into

the classroom. It follows that teachers' lack of confidence is one of the reasons behind the failure to adopt digital technology in the educational system.

Lack of sufficient training is another obstacle to the integration of technologies in the classroom environment. It is considered by many researchers one of the causes behind lack of confidence (Pelgrum's, 2001; Beggs, 2000; Balanskat et al., 2006; Schoepp, 2005; Toprakci, 2006). For this reason, unqualified teachers will not be encouraged to implement technology use in the classroom; hence, the need for adequate pedagogic training that can solve the dilemma of teachers (Gomes, 2005). Teachers need to have special digital competencies to effectively teach and use those skills while dealing with their students.

Resistance to change is another obstacle to the integration of technology into the classroom. It has become essential that teachers use technology to meet students' needs and to empower the learning environment. Different studies (Watson, 1999; Becta, 2004; Schoepp, 2005) asserted that teachers' resistance to change may be due to their negative attitude (attitude consists of three main components: affective, cognitive, and behavioral.) towards technology, their satisfaction with their traditional methods of teaching and/or limited knowledge of these technological means. Put differently, teachers do not use technological material as an integral part of their way of teaching since they ignore the benefits of such use (Empirica, 2006; Cox et al., 1999). Accordingly, teachers should be helped to grasp the utility of using digital tools in education. The positive attitude of teachers towards computer-based instruction is necessary for the integration of digital tools in the classroom, when required.

Zhao and Cziko (2001) stipulated that there are three requirements that teachers should meet to implement technology in the classroom. First, teachers should believe in the efficacy of teaching via the use of technological material, i.e., teachers can achieve their objectives far better than the use of traditional methods. Second, they should maintain that the use of digital content will not hinder their higher-level goals. Finally, they should have the necessary knowledge and efficiency to manipulate and control the material in the classroom.

One key solution to most of the constraints cited above is the necessity of practical training for both teachers and students. Such a practice should take into consideration the pedagogic needs of higher education students. The aim is to make them lifelong learners, able to take in charge their learning, provide them with the necessary skills to increase their opportunities of surviving in the world of work and prepare them for a more global future. Teachers can also gain from didactic trainings, likely to encourage them to introduce technologies into the classroom confidently. It is expected to allow them to solve some underlying technical problems that they may face in the classroom.

Institutions
A significant number of researchers (Becta 2004; Pelgrum, 2001; Toprakci, 2006) identified the lack of accessibility as an obstacle to the adoption of technologies to education. Becta (2004) explained that lack of availability does not necessarily refer to the lack of material in the higher education institution. It can refer to the poor quality of digital equipment, poorly organized resources, faulty hardware, and software, which discourage teachers from using that material likely to create problems (waste of time, boredom, loss of motivation, to cite a few) to students instead of solving them. In line with the findings of Becta (2004), Pelgrum (2001), in their surveys, reveal that lack of accessibility as a barrier can refer to different things: inadequate internet access, inappropriate peripherals, scarcity of computers, old/ slow computers, etc. Eventually, without adequate and available material, teachers will never be able to introduce technologies into their classrooms. I think universities should provide sufficient funding for the acquisition of an up to date digital material to facilitate the leaning teaching process

Both Lewis (2003) and Pelgrum (2001) demonstrated that appropriate technical assistance is crucial to the implementation of digital literacy in the educational system. According to Sicilia (2005), technical issues include malfunctioning computers and printers, failure of the internet to open, and failure of connection, which may affect the smooth flow of classroom activities. Indeed, teachers should not worry about fixing problems due to

202

the collapse of the material during the implementation of their courses. Thus, they should be provided with technical support to overcome such embarrassing situations.

Another significant recommendation for institutions of higher education is to include digital literacy in students' curriculum (Beetham et al., 2010). Colleges and universities should extend the focus more directly on developing holistic digital literacy strategies that take into consideration the teachers' and students' needs.

Limitations

Despite the fact that this study lays emphasis on the main obstacles that inhibit the introduction and adoption of digital technology in the classroom, it fails to consider many of them such as poor funding (Balanskat et al, 2006), absence of administrative support (Beggs, 2000), time constraints (Gomes, 2005; Sicilia, 2005), lack of leadership support (Grimus, 2000), lack of infrastructure (Pelgrum, 2001) etc.) that are related to teachers, students and/ or institutions. However, investigating them will bring about a deep understanding of the problems that higher education faces in integrating digital literacy and, therefore, be able to provide adequate solutions.

Bingimlas (2009) gave many examples to show the interrelationship between the different obstacles that hinder the integration of technology in higher education. For instance, lack of accessibility entertains tight relations with lack of confidence, technical support, and training. The technological material may be available in the institution, but teachers' lack of efficacy and training may impede the usage of the accessible material and, therefore, reduces the adoption of digital literacy in the educational system.

Conclusion

Overall, this article reports on and assesses the effect of the integration of digital skills on successful academic achievement, lifelong learning, and employability in the future. There are, however, obstacles that inhibit the adoption of digital literacy in higher education as a coherent strategy to promote these skills. Some obstacles are student-related, such as the digital divide, low self-efficacy, anxiety, and overconfidence. Others are attributed to the teachers' digital literacy; they include lack of confidence, lack of effective training, and resistance to change, which may be interrelated. Without forgetting the institutions' failure to provide an adequate development of digital literacy due to lack of accessibility and technical assistance.

To increase the likelihood of an effective implementation of digital literacy, higher education institutions should adopt an appropriate holistic strategy to engage both students and teachers in digital literacy to prepare them to cope with the global world of work; otherwise, the outcome will make the reliability of universities and colleges questionable. Undoubtedly, there should come a time when in box's words 'technology becomes invisible, embedded in everyday practice and hence 'normalised'. […] Normalisation is therefore the stage when a technology is […] hardly even recognised as a technology, taken for granted in everyday life (Bax, 2003: 23.

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