



Research Article

© 2019 Khadija Alhumaid.
This is an open access article licensed under the Creative Commons
Attribution-NonCommercial-NoDerivs License
(<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Four Ways Technology Has Negatively Changed Education

Dr. Khadija Alhumaid

Zayed University, UAE

Doi: 10.2478/jesr-2019-0049

Abstract

Our experience with technology is a bitter-sweet one. We relish its presence in our lives, but we dread the effect it may have on our manners, attitudes and social interactions. We open the gates of our schools to all types of technological tools, yet we fear it may badly impact our students' performance. This article investigates the ways through which classroom technology such as iPad, Internet connection, laptops and social media, impacts negatively on education. Relevant research has proven that technology could change education negatively through four paths: deteriorating students' competences of reading and writing, dehumanizing educational environments, distorting social interactions between teachers and students and isolating individuals when using technology.

Keywords: educational technology; educational environment; student competencies; nonachievement, isolation

1. Introduction

Wikipedia defines technology as “the collection of techniques, skills, methods, and processes used in the production of goods or services or in the accomplishment of objectives, such as scientific investigation.” In the field of education, it is “the use of machines and educational equipment of different sorts (e.g. language laboratories, tape recorders, video, etc.) to assist teachers and learners,” (Richards and Schmidt, 2010, p. 190). Technology has never been distant from man. Ever since he existed on earth, his life has been rife with technological devices. Technology has been his harbinger to harness nature and defy its unconquerable forces. However, over the last 50 years or so, the presence of technology in our lives has been markedly accentuated. Technology has, in recent years, had its indelible effect on everything we do. Everywhere we are: at work, at home or at school, technology is there, at the very tips of our fingers, reshaping our existence and infiltrating in the nooks and crannies of our existence. Theodosakis (in Bahloul. 2012, x) writes: “Every minute, over 48 hours of video are uploaded to YouTube. And every day, over three billion videos are viewed on that one channel alone.” Bahloul (2012, Introduction, p. 3) further stipulates:

Over three billion videos are viewed every day; users upload the equivalent of 240.000 full-length films every week; as for users' demographic, it is broad and includes young and older generations. Not only do people watch videos, they get also involved, and over 100 million people take a social action on YouTube (likes, shares, comments, etc.) every week.

Hull (2003, p. 233) also refers to the new technologies as new types of “literacies.” They have already become part of our lives. They are no longer “just add-ons, nice to have but dispensable; they are at the very center of those forms and practices of communication and representation that are crucial in our new times.” In the field of education, Information and Communication Technologies (ICT) have already invaded the scene. Digital devices such as computers, tablets, iPads, word processors, e-mails and the Internet have entered the classroom and altered the face

of teaching and learning. In fact, the trend towards technology-enhanced learning has flourished so rapidly that students, who are tech-savvy already, have grown enthused and imbued with subjects where technology is merged with ordinary teaching tools. As a matter of fact, classroom teachers are now spurred from all sides to use technology as frequently as they can, and students are daily exposed to loads of information reaching them via a variety of technological devices. Added to that, a stockpile of research has been produced, eulogizing the unequivocally-positive effect of inserting technologies in the normal course of instruction on students' performance (McFarlane, 1997; Christensen, 1999; Epper, A. Bates and T. Bates, 2001; Laurillard, 2002; Roblyer, 2003; Lowerison et al, 2006 amongst others).

Nevertheless, evoking the ubiquitous effect technology has on the education field should by no means be restricted to relating its benefits. Technology is not simply about using new gadgets and apps, and being excited at using them. There is more than that to technology. Hence, any debates about technology that do not envisage its potential risks or gauge the hindrances that it might bring to education would be faulty and incomplete. According to Flanagan (2008, p. 2), any inquiry about the effect of classroom technology should "include positive and negative effects on student achievement and the various types of technology that can increase or decrease a student's ability to do work in the classroom."

The present article is of great significance as it purports to shed light on that negative side of classroom technology that much research has so far been ignoring. The decrease in students' performance, particularly in reading and writing, the dehumanization of the educational environment, the distortion of social relations as well as the isolation that individuals experience when using technology are among the most pervasive and recurrent effects technology has brought to the classroom scene and that will be highlighted in the following sections of the present article.

2. Literature Review

Various surveys have been conducted evoking the advantages of using technology in the classroom. Worldwide, the run for integrating technology in education has been a common practice. The effectiveness of educational systems is now gauged against the amount of technology that is being used. Referring to a study conducted by the Cambridge International Global Education Census that encompassed 10,209 teachers and 9,397 students from all over the world, Ascione (2018, paragraph 5) noted that

Nearly half (48 percent) of surveyed students use a desktop computer at school, 42 percent use a smartphone, 33 percent use interactive whiteboards, and 20 percent use tablets. Students in China use tablets the most, with one in two students using the devices.

In the United States, in 2015, around 88 percent of 8th-graders and 83 percent of 4th-graders say they use computers at home. Similarly, 80 percent of 8th-graders report using a computer for schoolwork, according to data released by the National Center for Education Statistics (<https://nces.ed.gov/fastfacts/display.asp?id=46>). In China, and according to the website www.newatlas.com, 60,000 schools are now using a technological device to mark students' tests, hence replace human markers. However, albeit its being utterly useful, technology still has drastic effects that are worth unveiling. Consequently, the debate over its impact has lately grown louder, and the number of studies which aim to highlight this impact has escalated in a remarkable way (George and Odgers, 2015; Lee, 2009; LeBlanc, Katzmarzyk and Barreira, 2015; Paul and Brier, 2001; Putnam, 2000; Turkle, 2011 amongst others). In fact, in a report released in 2017, the United Nations International Children's Emergency Fund (UNICEF) declares: "Digital technology and interactivity also pose significant risks to children's safety, privacy and well-being, magnifying threats and harms that many children already face offline and making already-vulnerable children even more vulnerable," (p. 8)

In 2017, Denoël et al conducted a study aiming to examine the effect of introducing children to information and communication technologies (ICT) both at home and during school time. The survey involved a population of 39, 15-year-old students: 27 participants from European countries

and 12 participants from non-European countries. Data collated from the survey revealed that students of a high-socioeconomic-status generally start using classroom technologies such as laptops, tablets and e-books at an earlier age than students coming from low-income households; which has its repercussion on the equity between students. The study also showed that much exposure to technology has a negative impact on students' school performance.

Another study was conducted by Carter, Greenberg and Walker (2017) in a West Point college, in New York, U.S.A. The study aimed to find out whether technology, precisely Internet-connected computers, should be integrated in the normal course of instruction for the Principles of Economics classes. Participants in the study were sophomore students, and the sample was randomly selected from classes of around 15 students each. Experiments took place during the 2014-15 and 2015-16 school years. Participants were divided in three groups: the first group followed courses with no connection to any technological devices; the second group was allowed the free use of tablets and laptops; the third group used technology under particular restrictions. Analysis of data collated from the three groups revealed that students in classrooms where no Internet-connected devices were used scored much higher in their tests (72.9 %) than those in classes where laptops and tablets were allowed.

Another study was carried out by Purcell, Buchanan and Friedrich in 2013. The study's objective was to investigate teachers' views regarding the impact of incorporating digital tools in teaching writing on middle and high school students' writing skills. The study involved a sample of 2,462 teachers from the U.S. A. and Puerto Rico. The aim of the study was to provide data about the students' performance in writing following the use of digital tools when teaching writing. The gathered data revealed alarming facts about students' writing skill. In fact, 68% of surveyed teachers admit that digital tools make students take shortcuts, instead of investing any effort in writing, 67 % report students have difficulty reading and comprehending complicated texts, and 46 % say digital tools make students write fast and carelessly. The study also points out that students tend to use more and more abbreviations in their writings, following the way they write when communicating electronically.

A similar study was conducted by Dansieh in 2011. Its aim was to identify the potential impact of text messaging on students' written communication skills. The study encompassed a population of 1,300 participants who had to respond to two survey questionnaires: one for students and another one for lecturers. Gathered data were tabulated and analyzed via the Statistical Package for Social Sciences (SPSS) software. The study found that text messaging drastically affects students' writing, including spelling, sentence construction and syntactic structures. It further revealed that short forms and abbreviations used in electronic messaging are now commonly deployed in students' classroom writing to the extent that much of what they write is blurred and problematic. Examples of these abbreviations include, but are not restricted to: 'u' for you, 'b/4' for before, '2moro' for tomorrow, '2day' for today, 'Eng' for English, 'pls' or 'plz' for please, and so forth.

In 2009, another study was conducted by The Josephson Institute of Ethics (JIE), a nonprofit Canadian organization seeking to improve the ethical quality of social life. The study involved 23,000 high school students who were interviewed about certain ethical issues, namely honesty and integrity. 51 % of respondent acknowledged having cheated during the exams, without feeling any qualms about doing it. The study also called attention to the fact that it is technology that made it easier for students to cheat, hence causing real harm to the "six universal ethical values (trustworthiness, respect, responsibility, fairness, caring, and citizenship) called the Six Pillars of Character," (JIE, 2009, paragraph 5). Supporting findings reached by the JIE, Wallace (2009, paragraph. 13) writes: "Last year, in Orange County, California, hundreds of students' scores on Advanced Placement tests were wiped away after some students texted during the exam."

In 1999, Algerioy carried out a study investigating the impact of using multimedia devices such as webcams, digital cameras, microphones and laptops on students' academic performance. The study involved 62 first graders all enrolled in a Riyadh secondary school, Saudi Arabia. Participants were divided into two groups: an experimental group using multimedia devices in their mathematics lessons and a control group studying mathematics following a traditional method that is without incorporating any digital tools. The study revealed no statistically-significant differences in

performance between the experimental group and the control group, particularly in terms of remembering, understanding and applying mathematical rules. Accordingly, findings prove that integrating digital tools in teaching math concepts does not automatically yield an improvement in students' math skills.

This section of the article has allowed the review of a number of studies which dipped into the changes that the use of technology may bring to the educational field, especially to the attitudes of students toward learning. The studies provided a reverse-of-the medal image to the rosy view that is widely held about the use of technology, and revealed findings that are of paramount significance as regarding students' achievements in subjects such as math, reading and writing. The studies also pointed to the peevish impact that the integration of technology in the classroom might have on the values society strives to preserve and permeate. In the following section of the present article, more details will be provided related to the negative effects technology may have on the educational environment.

3. Four Ways Technology Has Negatively Changed Education

As mentioned in earlier sections of our report, technology is radically changing the way we understand the learning process, defined by Wikipedia as the set of strategies people deploy in "acquiring new, or modifying existing, knowledge, behaviors, skills, values, or preferences." Computer-based instruction is now prevailing throughout the learning environments all over the world, reshaping minds and imposing new roles on both teachers and students. Thanks to the integration of technology in classroom environments, students are active, motivated and eager to learn (Al-Hariri & Al-Hattami, 2007; Aloraini, 2012; Eyyam, & Yaratana, 2014). They also assume greater responsibility for their learning (Johnson, Schwab, & Foa, 1999). Individualizing learning, which is regarded as an implication of technology, makes students more capable to cope with problems independently (Viorica-Torii & Carmen, 2013). Consequently, teachers are no longer transmitters of information; rather, they are engineers or designers of learning environments (Hairon & Chai, 2017). Their main task is to re-arrange the elements of effective learning through placing themselves in the middle between students and curricula. However, recent studies have shown that technology has a negative impact on the process of education (Fried, 2008; Wentworth & Middleton, 2014), particularly on the four areas stated below:

- Deterioration of students' competencies in reading, writing, and arithmetic, which are the basic three skills any student is expected to master;
- Dehumanization of education in many environments and distortion of the relationship between teachers and students;
- Isolation of students in a digital and virtual world that distances them from any form of social interaction;
- Deepening of social inequalities between the haves and the have-nots that is students who can possess technology and those who cannot.

3.1 Deterioration of Students' Competencies in Reading, Writing and Arithmetic

Despite the widespread that classroom technology generally improves students' academic achievement and enhances their motivation to accomplish their tasks (Al-Hariri & Al-Hattami, 2017; Bishop & Verleger, 2013; Clarke & Svanaes, 2014, Haßler, Major, & Hennessy, 2015; Izadpanah & Alavi, 2016 amongst others), much reliance on technology seems to severely affect students' competencies in three skills that are of uncontested importance to them, namely reading, writing and arithmetic. Spitzer (2014) gives a full account of the risks of adopting technology in the classroom and warns against its potential negative effects on students' achievements. He cites literature affirming that handwriting and reading are impaired by typing and that Information Technology (IT) brings about shallow processing of information. That is why, students do not learn a lot from Google Books in the same fashion they do from printed books and magazines. Similarly, Carr (2011) accuses technology of causing our minds to be "shallow" and asserts that students who read linear texts have better understanding and a stronger memory than those who read via the

Internet. He argues (2011, p. 90) that “The shift from paper to screen doesn’t just change the way we navigate a piece of writing. It also influences the degree of attention we devote to it and the depth of our immersion in it.” Carr affirms that the Internet, for instance, brings about superficial, easily-distracted readers, as “When we go online, we enter an environment that promotes cursory reading, hurried and distracted thinking, and superficial learning,” (2011, p. 116).

Another example of the negative effect of technological devices such as smartphones, tablets, PCs and laptops on students’ performance is brought to us by Strain-Moritz (2016), an experienced teacher who ascertains that texting has negatively impacted students’ ability to write full sentences, with no fragmentation or awkward punctuation. Alhusban (2016) also stipulates that classroom technologies drastically affect students’ ability to write, notably when it comes to spelling and punctuation, grammatical accuracy, spelling, proofreading, critical thinking, respect of coherence and linearity. She also argues that constant exposure to short forms cripples students’ ability to splash out effort in writing and that the short forms that are frequently used in texting makes it daunting for them to distinguish formal conventions of writing from informal ones. Bronowicki, (2014) adopts a similar viewpoint, namely that students have become lazy because of their heavy, daily reliance on technology. The problem is even worse in primary schools where students are overwhelmed by technology, especially smartphones; which finally leads their use of grammar to be negatively affected by *textese* (e.g. *4ever* instead of *forever*) (van Dijk et al, 2016). Similarly, Granata (2019, paragraph 1) declares that “Students have put down beloved paperbacks and replaced them with smartphones, iPads and other technology. Kids’ reading for pleasure has dropped tremendously over the past 40 years, and technology may be to blame.”

As far as math and arithmetic are concerned, reliance on technology in teaching these subjects involves a plethora of potential risks. In fact, in 1998, Zheng reviewed the negative effects of using calculators and reached the following conclusion:

Concern for the negative impact of using calculators, especially graphing calculators, is very real. Because calculators are generally numerical in nature, students may not acquire solid conceptual understanding. Their view of mathematics will probably be more procedural and accordingly, their problem-solving skills may be limited. The development of their structural view about mathematics could also be hindered. Moreover, because of it [sic.] design, a calculator may deliver misleading information and create confusion in learning notation (1998, p. 9).

Around 30 years later, precisely in 2012, the UK government announced its intention to ban calculators in primary schools because students use them too much (Stacey, 2014). Math and arithmetic are in their purest forms, subjects which promote discovery, exploration and critical thinking. The use of technology in teaching these subjects, albeit helpful, does constitute a hindrance to the flourishing of students’ analytical reasoning, research has proven.

3.2 The Dehumanising Effect of Technology

While the use of technology has increased the quantity of information taught in a shorter time and has definitely made students able to visualise this information in a better way (e.g. via PowerPoint Presentations, maps and charts), the overreliance on technology in classrooms has a dehumanising effect. Kemp et al. (2015, p.4) announces that over the last decade in particular, “teaching has been ripped from the realm of human endeavours and morphed into a technological leviathan that is slowly usurping the soul of the profession.” This ‘*leviathan*’, a mythical sea monster according to the Jewish beliefs, is available in many areas and at many levels of education, including pre-packaged curricula that are not designed by the teacher of a particular course. In higher-education institutions and in online courses, for instance, teachers present their lessons from afar, and students are required to interact with machines, rather than with human beings. The ultimate result is a teacher who does not know anything or very little about his/her students and students showing no close relationship with their teacher. Cazan et al (2016); Izadpanah & Alavi (2016) and Nye (2006) amongst others, have already highlighted the dehumanizing effect of technology on student-teacher relationships. In fact, Nye (2006, p. 186) argues that Technology “pulls you away from the physical environment. You really do tune out the world,” and that “Today’s

college students are habituated to a world of online blogging, instant messaging, and Web browsing that leaves electronic traces,” (p. 188). Izadpanah & Alavi (2016) studied the attitudes of a group of Iranian high-school students towards using computers as a medium to facilitate learning English in classrooms. Results collated from the study show that about 58% of the students involved in the survey believe that using computers has a dehumanising effect. Similar results were found by Cazan et al (2016), who investigated the relationship between the level of anxiety among some high-school and university students in Romania, and their computer literacy. Investigation has shown that the higher the students’ computer self-efficacy is, the less anxiety they have in the classrooms. In a society like the Romanian one, where access to computers at home is very limited, many students are expected to feel anxious when they are expected to handle digital devices in the classrooms. Dependence on technology in the classrooms also entails the lack of rapport between teachers and students and/or among students themselves; which leads to eroding the social relationships involved in teaching, thereby eroding one of the main aims of education (Nneji, 2014). If teachers depend on technology for a long time in the classrooms, there is hardly any time for them to have any impact on their students. In the same fashion, students do not have the opportunity to develop sound relationships with one another. Rivedal (2017) refers to the dehumanising aspect of technology as a “zombie walk” and writes (paragraph 6) that “Our students who are the most disengaged are typically the ones who are stuck on their phones and walking the halls with their heads down.” Wilkins (2014) also cites facts about teachers’ and learners’ attitudes towards the use of technology and its drastic effect on student-teacher relationships, with some believing that using technology hampers the rapport between teachers and students and forms an obstacle to easy communication between them.

3.3 Technology and Isolation

One distinctive feature of face to face teaching is collectivism and collaboration whilst the most distinctive feature of technology-based teaching is the lack of any feeling of collectivism or togetherness. The psychoanalytic Theory defines isolation as a defence mechanism undertaken by the mind when individuals are caught in a context that they find threatening or unpleasant. That is why students who frequently use technology gradually develop a feeling of safety and security when “wired” to their gadgets, and start keeping away from all forms of social connections which may get them disconnected. In 2001, Paul & Brier coined the word “friendsickness” to refer to the isolation students feel when moving to college and leaving old school friendships behind. They pretend that technology bridges that gap in relationships and provides those young students with the impression that those friendships have not faded away. Technology helps Technology cocoons individuals in the virtual world, enmeshes them and brings about a feeling of isolation. Lee (2009, p. 510) calls attention to the danger of technology-enhanced isolation and the threatening impact it may have on the children’s social development, arguing that

The observation that a computer is placed in an individual’s room rather than a family room and that a child uses a computer alone without any other family members’ presence amplifies concerns about social isolation and harmful influences on children’s social development

Turkle (2011) points to the dichotomous effect of technology when it tears its user between the illusive impression of company, on the one hand, and the dreadful reality of isolation, on the other. She stipulates (p. 280): “Online, we easily find ‘company’, but are exhausted by the pressure of performance. We enjoy continual connection but rarely have each other’s attention.” In fact, and particularly in virtual or distance learning, students’ relationships with their teachers and colleagues are very weak; which may bring about a feeling of isolation and hamper students’ need for collaboration (Croft et al, 2010). In the UK alone, for instance, 13 universities have distance learning programmes allowing more than 1500 Master’s programme students to study via the Internet. Although these students are supported in many ways, via interactive assignments, tailored support and online forums, they do not have access to the community of students living on campus; which creates a sense of loneliness (Vonberg, 2015). This feeling of isolation often results in a

feeling of loneliness and is greatly related to the dehumanising effect of technology. Both issues involve the neglect of human relations in the educational field and prioritize thorough dependence on technology. Teachers depend on technological devices to teach and students are deprived of any form of social interaction. What is more alarming is that isolation is more and more prevalent among young students who, across the world, attend schools where the use of tablets is commonplace. Karsenti & Fievez (2013) evoke the case of Quebec children being distracted due to the excessive reliance on tablets in learning. Iserbyt et al (2014) insist that the repetitive use of technology-based games and entertainment, in a bid to render the lessons more appealing, entails students' isolation, and could finally lead to poorer outcomes of learning. Distraction can also be added to the technical problems accompanying the use of tablets by young students, even in the case of completing simple tasks such as gap filling and matching, especially if there is no technical support available to deal with those problems in a prompt way (Culén & Gasparini, 2012). Moreover, the advent of smartphones has led to a quantum leap in the integration of ICT in education. Smartphones are now widely used in many areas around the globe. Supported by a large number of educational apps, Smartphones are seen as a promising way of teaching, especially at the higher-educational level (El-Hussein & Cronje, 2010). Smartphones are currently seen as facilitators of sharing content and communication through messaging (Kearney et al, 2012). However, research has proven that the widespread use of smartphones in the learning process leads to student distraction, the fragmentation of knowledge and the inability of teachers to manage classrooms (Şad & Göktaş, 2014). In short, isolation and loneliness seem to be the ultimate repercussion of students' use of technology as, being totally immersed in manipulating the classroom digital gadgets, they often forget there are classmates they can rely on and interact with.

3.4 Technology and the Gap between Social Classes

Another negative aspect of reliance on technology in education is the big gap that technology creates between the rich and the poor. Large differences between developed and developing countries are very clear in the infrastructure of schools. While schools in developed countries are provided with nearly all technological devices (PCS, laptops, tablets, projectors and Internet access), those in developing countries largely lack all these devices. Thus, students in developing countries graduate with limited basic technological skills (e.g., PC literacy) and face huge problems to find a well-paid job, or find it too difficult to compete in the global market. Even in developed countries, there is usually a *digital divide* (van Dijk & Hacker, 2011); that is, there is a big difference between students coming from different social backgrounds. Poor students may have access to technology in classrooms, but cannot afford any gadget at home, which is very clear in the academic achievement of these poor students compared to their rich peers. According to a report by the National Telecommunications and Information Administration (NTIA), townspeople in the US are 50% more likely to have Internet access than those living in rural areas (Steele-Carlin, 2017). A comment by Sarah Phinney, the distance learning coordinator at Porterville Adult School in Central California, shows the results of this digital divide as follows:

In my seven years' experience working with this population [at Porterville Adult School], I have found that a great number of the students we serve, especially those who speak English as a second language, are computer illiterate and thus are on the lean side of the divide (Steele-Carlin, 2017).

If this is the result of the digital divide in the US, it must be much bigger and more serious in other countries where the divide is bigger as is the case in Egypt where private schools and universities have a good, working technological environment compared to state schools and universities, which is reflected in the greatly different levels of graduates from both types of education (Warschauer, 2011). Although the Egyptian government has provided many of its schools with technological devices and access to the Internet, they are hardly used because of severe red tape or lack of training provided to teachers. At home, the majority of Egyptians cannot afford to buy any technological device or original software; therefore, most graduates of state

educational institutions lack the basic PC skills and need much rehabilitation after they graduate. Needless to say that the digital divide may develop antisocial behaviour because the technology-marginalized students may develop a feeling of oppression and nonachievement.

4. Suggested Paths for Better Practice

Nowadays, the use of technology in education is pervasive. Modern technological devices have known vast expansion all over the world, leading to substantial changes in the way students learn and instructors teach. Quite often, the degree of success of an educational institution is measured against the amount of technology that is being integrated in its classrooms. Technology therefore has so far had a substantial stake in students' social and educational lives; which obviously raises a heated concern about the effects of its use. A stockpile of researchers now look at the impact of technology on students' lives with intrigue and strive to curb the drastic effects of these classroom gadgets on students' behavior and attitudes. In the while, no one contests that removing technology from the classroom is practically impossible. Yet limiting its negative effects is still at our reach. UNICEF (2017, p. 122) advises technology users to "Harness the good" and "limit the harm." Wilkins (2014) provides a list of recommendations on how to handle technology in a way that would not be threatening to students. Her suggestions encompass:

- Making sure learners to interact with each other even when immersed in their digital world,
- Devising activities which necessarily promote communication and collaboration,
- Sharing and comparing (blog posts, classroom projects ...) to see how technology can connect learners all around the world,
- Encouraging tech-savvy students to design interactive content that would enrich the course

Teacher training may also be another springboard whereon to stand when seeking to guarantee the appropriate use of technology. In fact, the more training teachers receive, the better way technology would be used and the less negative effects it would entail. Laurillard (2002) argues that to be effective, technology-based devices would not be effective unless their use is accompanied by appropriate pedagogical approaches. Similarly, McFarlane (1997) ascertains that inserting technology in teaching will not have the expected added value unless objectives are clearly set and tasks are well-designed. Moreover, educational systems are now required to ensure that integrating ICT programs in the curriculum should be supported by effective Continuing Professional Development (CPD) programs for instructors wherein technology-based learning is incorporated. Parents should also be made aware that technology is not a blessing all the time, and that it is now their own priority to harness that strong drive among their offsprings to use technology everywhere and at any time.

Technology is not static. It constantly changes, bringing in new devices and sending others to obsolescence. Taking this aspect of technology in consideration involves keeping up with that pace and aligning pedagogy with technology, thus harnessing hindrances and augmenting benefits.

5. Conclusion

Over the past 50 years or so, technology has found its way to the classroom and has indomitably altered the face of learning and teaching. Technology is now considered as one of the most important skills 21st century learners should possess. It is a new literacy that facilitates access to multitude sources of knowledge. Whether positive or negative, this move towards integrating technology in the classroom will never come to an end, and each new development will nurture another more appealing one. A lot has been written and said about students being technology crazy and they were given so many names: 'the Net Generation' (Tapscott, 1999), 'Digital Natives' (Prensky, 2001), 'the Gamer Generation' (Carstens and Beck, 2005), 'New Millennium Learners' (Pedró, 2006), etc. This craze about technology should be supervised, otherwise, risks would be numerous and effects would be drastic. In fact, while many of our students believe that they are learning well when using technology, many negative and non-educational attitudes are prevailing

among them. Obviously, no one can imagine learning without technology and no one can currently understand how an educational environment can attain desired purposes and aims without actual use of technology. However, the use, precisely the excessive use, of technology might contradict many educational purposes if measures were not taken to limit the negative changes it could cause to education. The significance of the present article lies in the fact that it has shed light on the potential negative effects of using technology in the classroom, and suggested a number of practical solutions which would presumably help limit these effects.

References

- Algerioy, A. M. (1999). The impact of multimedia on the collection of first-grade students in secondary mathematics in Riyadh Journal of King Saud University - Languages and Translation, 24 (2), 75-82
- Al-Hariri, M., & Al-Hattami, A. (2017). Impact of students' use of technology on their learning achievements in physiology courses at the University of Dammam. Journal of Taibah University Medical Sciences, 12(1), 82-85.
- Alhusban, A. M. (2016). The Impact of Modern Technological Tools on Students' Writing Skills in English as a Second Language. US-China Education Review, 6 (7), 438-443.
- Aloraini, S. (2012). The impact of using multimedia on students' academic achievement in the College of Education at King Saud University. Journal of King Saud University-Languages and Translation, 75-82.
- Ascione, L. (2018). Do other countries value classroom technology equally? Available: <https://www.eschoolnews.com/2018/12/04/do-other-countries-value-classroom-technology-equally/> (July 2, 2019).
- Bahloul, M. (2012). Lights! Camera! Action and the Brain: The Use of Film in Education. Newcastle upon Tyne: Cambridge Scholars Publishing.
- Bishop, J., & Verleger, M. (2013). The flipped classroom: A survey of the research. 120th ASEE National Conference Proceedings, 30, pp. 1-8. Atlanta, GA.
- Bronowicki, K. A. (2014). Technology's adverse effects on students' writing: An emphasis on formal writing is needed in an academic curriculum. Master's Thesis: State University of New York. Available: https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?referer=https://www.google.com.eg/&httpsredir=1&article=1399&context=ehd_theses
- Carr, N. (2011). The Shallows: What the Internet Is Doing to Our Brains. New York: W. W. Norton & Company.
- Carstens, A. & Beck, J. (2005). Get Ready for the Gamer Generation. Tech Trends: Linking Research & Practice to Improve Learning, 49(3), 22-25.
- Carter, S. P., Greenberg, K. & Walker, W. S. (2017). Should Professors Ban Laptops? EducationNext, 17(4), 68-74.
- Cazan, A., Cocoradă, E., & Maican, C. (2016). Computer anxiety and attitudes towards the computer and the internet with Romanian high-school and university students. Computers in Human Behavior, 55, 258-267.
- Christensen, K. S. (1999). A Comparison of Student Performance in Human Development Classes Using Three Different Modes of Delivery: Online, Face-to-Face, and Combined. Department of Education: Drake University.
- Clarke, B., & Svanaes, S. (2014). An updated literature review on the use of tablets in education. Tablets for Schools. UK: Family Kids & Youth.
- Croft, N. Dalton, A. & Grant, M. (2010). Overcoming isolation in distance learning: Building a learning community through time and space. Journal for Education in the Built Environment, 5(1), 27-64.
- Culén, A., & Gasparini, A. (2012). Tweens with the iPad classroom – Cool but not really helpful. International Conference on e-learning and e-technologies in education (ICEEE), (pp. 1-6). Technical University of Lodz, Poland.
- Dansieh, S. A. (2011). SMS Texting and Its Potential Impacts on Students' Written Communication Skills. International Journal of English Linguistics, 1(2), 222-229.
- Denoël, E., Dom, E., Goodman, A., Hiltunen, J., Krawitz, M. & Mourshed, M. (2017). Drivers of Student Performance: Insights from Europe. McKinsey & Company.
- El-Hussein, M., & Cronje, J. (2010). Defining mobile learning in the higher education landscape. Educational Technology & Society, 13(3), 12-21.
- Epper, R. & Bates, A. (2001). Teaching Faculty How to Use Technology. USA: American Council on Education. Oryx Press.
- Eyyam, R., & Yaratani, H. (2014). Impact of use of technology in mathematics lessons on student achievement and attitudes. Social Behavior and Personality: An International Journal, 42(1), 31S-42S.
- Flanagan, J., L. (2008). Technology: The Positive and Negative Effects on Student Achievement. NY: University of New York.

- Fried, C. B. (2008). In-class laptop use and its effects on student learning. *Computers & Education*, 50(3), 906-914.
- Granata, K. (2019). Tech May Be to Blame for Decline in Students' Reading for Pleasure: *Education World*. Available: https://www.educationworld.com/a_news/technology-proves-negatively-effect-reading-skills
- Hairon, S., & Chai, C. (2017). The learning revolution: From pedagogues to designers of learning. *Learning: Research and Practice*, 3(3), 79-84.
- Haßler, B., Major, L., & Hennessy, S. (2015). Tablet use in schools: A critical review of the evidence for learning outcomes. *Journal of Computer Assisted Learning*, 32(2), 139-156.
- Hull, G. A. (2003). At Last: Youth Culture and Digital Media: New Literacies for New Times. *Research in the Teaching of English*, 38 (2), 229-233.
- Iserbyt, P. C. (2014). Learning basic life support (BLS) with tablet PCs in reciprocal learning at school: Are videos superior to pictures? A randomized controlled trial. *Resuscitation*, 85, 809-813.
- Izadpanah, S., & Alavi, M. (2016). The perception of EFL high school students in using of computer technology in the process of learning: Merits and demerits. *Advances in Language and Literary Studies*, 7(3), 146-156.
- Johnson, M., Schwab, R., & Foa, L. (1999). Technology as a change agent for the teaching process. *Theory into Practice*, 38(1), 24-30.
- Karsenti, T., & Fievez, A. (2013). The iPad in education: Uses, benefits and challenges. A survey of 6,057 students and 302 teachers in Quebec, Canada. Montreal: CRIFPE.
- Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012). Viewing mobile learning from a pedagogical perspective. *Association for Learning Technology Journal*, 20(3), 1-17.
- Kemp, A., Preston, J., Page, C., Harper, R., Dillard, B., Flynn, J., & Yamaguchi, M. (2015). Technology and teaching: A conversation among faculty regarding the pros and cons of technology. *Qualitative Report*, 19(3), 1-23.
- Laurillard, D. (2002). *Rethinking University Teaching: A Conversational Framework for the Effective Use of Educational Technology* (2nd ed.). London: Routledge.
- LeBlanc A.G., Katzmarzyk P.T. & Barreira T.V. et al. (2015). Correlates of Total Sedentary Time and Screen Time in 9–11 Year-Old Children around the World: The International Study of Childhood Obesity, Lifestyle and the Environment. *PLoS ONE*, 10 (6). Available: from <https://www.ncbi.nlm.nih.gov/pubmed/26068231> (June 13, 2019).
- Lee S. J. (2009). Online Communication and Adolescent social Ties: Who Benefits more from Internet Use? *Journal of Computer-Mediated Communication*, 14(3), 509-531.
- Lowerison, G., Sclater, J., Schmid, R. F., & Abrami, P. (2006). Student perceived effectiveness of computer technology use in post-secondary classrooms. *Computers & Education*, 47(4), 465-489.
- McFarlane, A. (1997). *What Are We and How Did We Get Here? Information Technology and Authentic Learning: Realizing the Potential of Computers in the Primary Classroom*. London: Routledge.
- Nicholas, C., Dalton, A., & Grant, M. (2010). Overcoming isolation in distance learning: Building a learning community through time and space. *Journal for Education in the Built Environment*, 5(1), 27-64.
- Nneji, B. U. (2014). Technologies in education and the dehumanization and imperialization of pedagogy: The African perspective. *Bulgarian Journal of Science and Education Policy*, 8(1), 86-105.
- Nye, D. E. (2006). *Technology Matters: Questions to Live with*. The MIT Press.
- Paul, E. & Brier, S. (2001). Friendsickness in the Transition to College: Precollege Predictors and College Adjustment Correlates. *Journal of Counseling and Development*, 79(1), 77-89.
- Pedró, F. (2006, May). *The New Millennium Learners: Challenging our Views on ICT and Learning*. Available: <https://publications.iadb.org/en/new-millennium-learners-challenging-our-views-ict-and-learning>
- Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5), 1-6.
- Purcell, K., Buchanan, J. & Friedrich, L. (2013). *The Impact of Digital Tools on Student Writing and How Writing is taught in Schools*: Pew Research Center. Available: <https://www.pewinternet.org/2013/07/16/the-impact-of-digital-tools-on-student-writing-and-how-writing-is-taug>.
- Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- Richards, J. C. & Schmidt, R. (2010). *Longman Dictionary of Language Teaching and Applied Linguistics* (4th ed). London: Pearson.
- Rivedal, K. (2017). Madison Students Required to Disconnect from Social Media Apps in Pilot Program. *Wisconsin State Journal*. Available: https://madison.com/wsj/news/local/education/local_schools/madison-students-required-to-disconnect-f (June 15, 2019).
- Roblyer, M. D. (2003). *Integrating Educational Technology into Teaching*, (3rd ed). Upper Saddle River, NJ: Merrill Prentice Hall.
- Şad, S., & Göktaş, Ö. (2014). Preservice teachers' perceptions about using mobile phones and laptops in education as mobile learning tools. *British Journal of Educational Technology*, 45(4), 606-618.

- Spitzer, M. (2014). Information technology in education: Risks and side effects. *Trends in Neuroscience and Education*, 3(3-4), 81-85.
- Stacey, O. (2014, November). Subtracting calculators from maths tests doesn't add up. Available: <https://thenferblog.org/2014/11/12/subtracting-calculators-from-maths-tests-doesnt-add-up/>
- Steele-Carlin, S. (2017, June). Caught in the digital divide. *Education World*. Available: http://www.educationworld.com/a_tech/tech041.shtml
- Strain-Moritz, T. (2016). Perceptions of Technology Use and Its Effects on Student Writing. (Master's Thesis). Available: https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?referer=https://www.google.com.eg/&httpsredir=1&article=1399&context=ehd_theses
- Tapscott, D. (1999). *Growing up Digital: the Rise of the Net Generation*. New York: McGraw-Hill.
- The Josephson Institute of Ethics. (2009). Character Study Reveals Predictors of Lying and Cheating. Available: <https://josephsoninstitute.org/surveys/>
- The National Center for Education Statistics. Computer and Internet Use. Available: <https://nces.ed.gov/fastfacts/display.asp?id=46>
- Turkle, S. (2011). *Alone Together: Why we Expect more from Technology and less from Each Other*. New York: Basic Books.
- UNICEF Report (2017). *The State of the World's Children 2017: Children in a Digital World*. Available: https://www.unicef.org/publications/files/SOWC_2017_ENG_WEB.pdf (June 14, 2019).
- van Dijk, Ch. N., van Witteloostuijn, M., Vasić, N. Avrutin, S. and Blom, E. (2016). The influence of texting language on grammar and executive functions in primary school children. *PloS One*, 11(3), e0152409.
- van Dijk, J., & Hacker, K. (2011). The digital divide as a complex and dynamic phenomenon. *The Information Society: An International Journal*, 19(4), 315-326.
- Viorica-Torii, C., & Carmen, A. (2013). The impact of educational technology on the learning styles of students. *Procedia-Social and Behavioral Sciences*, 83, 851-855.
- Vonberg, J. (2015, December 8). The loneliness of the long distance learner. *The Guardian*. Available: <https://www.theguardian.com/higher-education-network/2015/dec/08/you-work-in-a-vacuum-the-loneliness-of-the-long-distance-learner>
- Wallace, K. (2009, June 17). High-Tech Cheating on the Rise at Schools. *Cbsnews*. Available: <https://www.cbsnews.com/news/high-tech-cheating-on-the-rise-at-schools/>
- Warschauer, M. (2011). Dissecting the "digital divide": A case study in Egypt. *The Information Society: An International Journal*, 297-304.
- Wentworth, D., & Middleton, J. (2014). Technology use and academic performance. *Computers & Education*, 78, 306-311.
- Wilkins, K. (2014, May). How New Technologies Affect Student-Teacher Relationships. *British Council Voices Magazine*. Available: <https://www.britishcouncil.org/voices-magazine/new-technologies-affect-student-teacher-relationships>
- Zheng, T. (1998). Impacts of using calculators in learning mathematics. *The 3rd Asian Technology Conference on Mathematics (ATCM'98)*, 1-10. Available: <http://www.any2any.org/EP/1998/ATCMP015/paper.pdf>