

Equity and Technology Use in Education

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ABSTRACT

With the rapid adoption of technology in the education sector, a paradigm shift from traditional learning methods to digital learning has been experienced. This article focuses on the importance of ensuring equity in the use of technology among learners, as it relates to their right to access educational technology. While the issue of digital transformation in education is a shared responsibility among educators, this article discusses it from a comprehensive perspective. Supposedly, equity in educational technology access is an issue addressed by researchers in different school settings, including researchers in science in K-12 settings. This article describes how assessment and evaluation could make a difference among learners when it comes to enhancing their capacity to access and use technology in learning. The article concludes with some recommendations for educational technology policymakers to ensure that all students have the same opportunity in accessing educational technology in a bid to avoid a digital divide among learners.

Keywords: Equity; Digital divide; Educational technology; School.

INTRODUCTION

This article consists of five distinct parts: The first part in this article highlights some of the responsibilities that researchers need to consider when conducting a research about equity in using technology in education. In the second part, there is a review of some issues related to integrating technology in the K-12 settings and how these factors are related to the equity among students. The third part describes an example of integrating technology in science in K-12 setting, in which teachers need to use some applications in the tablets to simplify some scientific concepts. The fourth part describes how important it is to consider equity in educational technology regarding the assessment and evaluation of students in many aspects such as evaluating students in the classroom activities. The fifth part explains how policy makers could help make decisions that will help in solving problems in the issues that are related to equity in the educational technology.

RESEARCH IN THE FIELD OF EQUITY IN EDUCATIONAL TECHNOLOGY

Research is all about finding information about issues, testing solutions to those issues, and making appropriate recommendations. In this light, researchers in the field of education technology ought to focus on some of the important issues in education technology. One of these issues relates to equity. Although many studies have been conducted in the field of educational technology, the topic of equity has received little attention (Tawfik, Reeves, & Stich, 2016). A research in equity will explore inequalities in educational technology and in so doing, close the existing inequality of

technology access. Accordingly, “we suggest that researchers and practitioners consider that educational technologies should balance the broader importance of inequality of access and opportunity within the scope of research” (Tawfik, Reeves, & Stich, 2016, p. 603). It is imperative that researchers in the field of educational technology select topics that focus on technology related issues that may have adverse effects of students. Researchers have to consider different aspects of research such as experimental design when undertaking research to investigate the digital divide that differentiate people inside the classroom. Researchers in the field of education technology have to explain to parents the importance of their studies when conducting studies that require parents’ inputs, for instance studies that may require researchers to conduct interview or survey among parents. Researchers have the responsibility to acquaint themselves with the training sections of CITI programs that offer for researchers, especially those that involve the utilization of technology in research. There are topics in CITI training that deal with cases that may face researchers when using the internet or any technology to conduct research, and one of these topics is equity.

When conducting a research that requires the use of technology, it is critical for the researchers to ensure that the participants have access to the necessary technology. Participants may lack access to the technology necessary in the study due to various circumstances, including their economic status. Besides, when selecting schools on which to conduct a research, researchers should think of all schools as equally rich in the technology required in the study. This can help understand the Digital Divide that may exist between students and among schools. Subramony (2011) explains the “Digital Divide” as an inequitable access to information and communications technology tools/resources that “can reasonably be described as one of the great social justice issues of the early 21st century” p. 20. Thus, researchers have to consider the issue of Digital Divide when conducting research, as a measure of boosting the validity of their studies. This issue needs more in-depth research to find the best solution to overcome it.

EDUCATIONAL TECHNOLOGY INTEGRATION WITHIN K-12 SETTINGS

Teachers in K-12 setting ought to employ technology in teaching. When integrating educational technology into teaching and learning within the K-12 setting, it is vital that teachers take equity into account. Equity is especially important when providing students with mobile devices, such as tablets, to complete class activities. The growing use of mobile devices in schools make it essential for schools to provide these devices to all students (Engelhard and Seo, 2012; Collis and Moonen, 2008). However, some schools cannot provide mobile devices to all students, and as a result, it becomes hard for teachers to ensure that all students do activities that require the use of technology. Some studies have been conducted on this issue, and some solutions have been proposed. One of these solutions is dubbed Bring Your Own Device (BYOD) policy. BYOD policy requires students who have their own devices at home to bring them to school for class activities. According to Kiger & Herro (2015), parents see BYOD policy as useful because it helps students to find and use internet resources. However, some parents have shown concern that BYOD policy can lead to equity issues, especially where the distribution is poor in the classroom, and when students use the devices inappropriately.

Different studies in the field of educational technology show that there are some factors that affect the equity of learning outcomes among students. These factors include how students use technology and their attitude toward the use technology in classroom (Jones & Issroff, 2007; Van Dijk, 2006; Wei, Teo, Chan, & Tan, 2011). Students’ positive attitude toward the use of mobile devices in class

activities helps promote both class activities and collaborative learning. However, learning collaboration over mobile devices within school settings should not facilitate discrimination of students on the basis of race or social status. Integrating mobile devices with class activities is one of the good ways of helping students to interact with each other and collaborate in learning. Davies & West (2014) highlight technology integration methods, namely “(a) developing technological skills, (b) increasing support through collaborative environments, and (c) providing increased mentoring” p. 844. These methods are essential for increasing the use of instructional technology, which of course is important for providing the school, equity in using technology. Educational technology specialist needs to understand the needs of a school in order to provide teachers with the appropriate professional development, necessary for them (teachers) to use technology effectively to help students increase their learning.

EDUCATIONAL TECHNOLOGY INTEGRATION IN THE SCIENCE WITHIN K-12 SETTINGS

Science is one of the courses in which technology plays a major role in the teaching process. Students in the science courses can use technology in different areas including physics, chemistry, biology, and geology. Many technology applications that teachers use in teaching science help deliver information necessary for all students to understand the topics. However, it is essential that teachers consider the equity among students in using these applications so that there is no differentiation between them when applying it in the classroom setting. For example, teachers should ensure that each student in the class has access to a device to work with, even if it means sharing of devices between two students. When teachers are doing an experiment with students in the science lab, each student should have the chance to do the experiment individually, even if it is a virtual experiment. In the PhET software, teachers can engage students using simulation to visualize and test scientific models (Shen, J., Lei, J., Chang, H. Y., & Namdar, B. 2014). Teachers have the responsibility to ensure that each student in the class has a device or works with another partner's device when doing class activities. In a science class, teachers sometimes use video to help students understand concepts. When students are watching a video in the class, it is important that the Educational Technology practitioners ensure that students can easily see the video. It is also imperative to make sure that students do not sit too far or in an angle that prevents them from clearly seeing the video.

Science education needs more fund to help students who are left behind, for instance students with special needs and those from minority communities. This fund can help to develop them through technology. According to Lynch, S. J. (2000),

“Science education is targeting those students who have been left behind in the past-Blacks, Hispanics, American Indian/Alaskan Natives, females, students with disabilities, and those who are learning English. These are the young people whom are least sure how to reach and teach science well. This implies the need for increased funding for research and development of innovative pedagogy and curriculum materials, supporting supplies for lab work, and technology” (p. 127).

Increasing funds for science education will help provide modern technology in teaching science. The fund will allow the purchase of mobile devices especially for science lab, necessary to help students understand concepts in science. When science teachers find these technologies in the science lab, they will be able to engage students learning through technology. With the right

technology, even students that are considered left behind due to various circumstances can be appropriately engaged in the learning process.

EDUCATION TECHNOLOGY ASSESSMENT AND EVALUATION

A number of technologies have been developed to enhance assessment in k-12 schools. It is essential that educational technology practitioners take into consideration issues such as equity during assessments that involve the use of technology. When a classroom has technology, the students can use it in class activities, and that helps enhance their learning. A study conducted by Tamim, Bernard, Borokhovski, Abrami, and Schmid (2011) found that the use of technology in class activities boost students' achievements during assessment. Tamim et al (2011) used 25 meta-analyses to estimate the effect of computer on students' achievements. They used different types of computer technology for the study, including computer assisted instruction and information and communication technology. Tamim et al (2011) found that students who use technology in the classroom have a higher achievement than students who do not use technology. Accordingly, "The average student in a classroom where technology is used will perform 12 percentile points higher than the average student in the traditional setting that does not use technology to enhance the learning process" (p. 17). From these findings, it is clear that the use of technology is important for students' achievement. Online learning also has significance in assessment since students use technology to study courses. The United States Department of Education (2009) used the meta-analysis, and found that students who receive online learning have higher outcomes than students who only receive face-to-face learning. A comparison of the achievement of students who are using technology in learning and those who are not using it proves that technology is essential in schools.

In addition, Competencies in Information and Communication Technology (ICT) is an important point in the digital literacy. The competencies of ICT users need to be evaluated in order to produce beneficial information. Accordingly,

"ICT assessment allows measurement of the digital divide resulting from differing digital literacy levels among individuals and countries. These differing levels of digital literacy produce a gap between those who have high-quality access to information technology and digital resources and those who have low-quality resources or none at all. This digital divide correlates not only to the availability of hardware and software resources but also to the development of skills and knowledge. This knowledge divide results from sociopolitical and socioeconomic factors and reflects existing gaps attributable to gender, race, income, or disability" p 325.

To ensure that each student has the ability to use technology without any problem, it is crucial that technology use starts from kindergarten through secondary education. This will help to address differences between students who have the ability to use technology and those who are unable to use it.

EDUCATIONAL TECHNOLOGY DECISION- AND POLICY-MAKING

The use of technology in k-12 schools is guided by the general educational policy. For technology to work well in elementary and secondary schools, a valiant policy is needed to boost the influence of technology in education. In the United States, the National Educational Technology Plan 2010 has a policy for making technology more effective (Office of Educational Technology (OET), 2010). However, each plan should consider the differences between communities (in terms of economic

status) to avoid the gap that may emerge if the plan does not consider people from low economic areas. For instance, an educational gap emerged in China when English language became compulsory for students from kindergarten to the university level (Harris, & Walling, 2014). Accordingly, "While the policy of teaching English universally expands access to language instruction, materials, and technology—albeit unevenly across regions—the national policy of restricting public access in China to government-approved media perpetuates unequal educational opportunities to learn and practice English" (pp. 636 - 637). To avoid the emergence of a gap, any government should consider elements that are important in transforming education. According to Harris & Walling (2014), there are six goals enunciated in Transforming American Education, namely learning, assessment, teaching, infrastructure, productivity, and research and development. These six goals are the basis for educational technology plan in the US. According to Kozma (2011), National educational Technology Plan (NETP) recommends a "set of technology-based changes in curriculum, pedagogy, assessment, teacher professional development, and school structure that can transform education and that will prepare our students for life and work in the twenty-first century, and support economic and social progress" (p.116).

However, any plan should consider economic issues as President Obama explained (Kozma, 2011). Economic status is an important factor to consider if the educational technology plan is to equalize access to technology for all students in the country. In Saudi Arabia, the government announced a new policy to digitalize learning and support blended learning for all schools in the country, by 2020. This plan aimed at stopping printing of textbooks and replacing them with tablets for each student. The plan is meant to boost the learning process and to transform it traditional learning to digital learning, "Future Gateway". This initiative is under the government Vision 2030. This project will start in 2017/2018 and then proceed in several steps until 2020. In the plan, all students from kindergartens up to grade 12 will be able to communicate with teachers through a special platform that will connect teachers, students and parents. As they announced, this system will adapt intelligently to each student's needs ("Saudi schools to go digital by 2020 | GulfNews.com," n.d.). However, this initiative will face many challenges, which will make it difficult for some students. The equity of having strong internet in schools is one of these challenges, especially in the rural areas (Lutter, 2016). Internet needs to be equally accessible in every school so that all students can equally use the platform, for instance to submit their homework.

CONCLUSION

In summary, equity in educational technology is a vital aspect that each school should consider. In collaboration with researchers, school districts should find out the perfect ways to close the existing gaps in achieving equity in the integration of technology in educational settings, particularly the K-12 settings. To ensure equity in the use of technology in the educational sector, school districts should also consider evaluating students in regards to the digital divide that affects students from low socioeconomic backgrounds.

While a significant increase in the use of technology in schools has been experienced over the past few years, policymakers still have a huge responsibility of bridging the equity gap in access and use of technology among learners. This gap could be closed by providing more technological equipment such as tablets and internet spots to all students, irrespective of their socioeconomic status. This strategy could go a long way to ensuring that all students have access to learning materials, particularly in courses that use blended learning models.

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