Asesorías y Tutorías para la Investigación Científica en la Educación Puig-Salabarría S.C.
José María Pino Suárez 400-2 esq a Lerdo de Tejada. Toluca, Estado de México. 7223898475
RFC: ATI120618V12

Revista Dilemas Contemporáneos: Educación, Política y Valores.
http://www.dilemascontemporaneoseducacionpoliticayvalores.com/
Año: VII Número: 2 Artículo no.:22 Período: 1ro de enero al 30 de abril del 2020.

TÍTULO: Reformar la enseñanza y el aprendizaje mediante la aplicación de EdTech en los campus.

AUTORES:

1. Ph.D. Zaffar Ahmed Shaikh.
2. Ph.D. Muhammad Ramzan Pahore.
3. Ph.D. Aamir Iqbal Umrani.
4. Ph.D. Sumera Memon.
5. Undergrad. Stud. Sumaiya Jamali.

RESUMEN: Este documento explora las formas en que EdTech se ha aplicado e implementado en los campus e informa sobre políticas, procedimientos y prácticas. Los resultados son que el futuro no puede predecirse; sin embargo, la tecnología es el presente y el futuro de este mundo. Como la educación es un salvavidas de cualquier sociedad y el desarrollo social de una sociedad depende de la educación, no se puede pasar por alto EdTech. Hoy en día, la implementación de EdTech no es un gran problema, ya que muchas organizaciones brindan a las instituciones educativas medios sólidos para adoptar y aplicar EdTech en sus campus.

PALABRAS CLAVES: realidad aumentada, EdTech, software educativo, tecnología educative, realidad virtual.

TITLE: Reforming Teaching and Learning through applying EdTech in campuses.

AUTHORS:

1. Ph.D. Zaffar Ahmed Shaikh.
2. Ph.D. Muhammad Ramzan Pahore.
3. Ph.D. Aamir Iqbal Umrani.
4. Ph.D. Sumera Memon.
5. Undergrad. Stud. Sumaiya Jamali.

ABSTRACT: This paper explores the ways EdTech has been applied and implemented on campuses and informs policy, procedures, and practices. The findings are that the future cannot be predicted however technology is the present and future of this world. As education is a lifeline of any society and the social development of a society depends on education, thus, EdTech cannot be overlooked. Today, EdTech implementation is not a big deal as many organizations provide educational institutions with solid means to adopt and apply EdTech in their campuses.

KEY WORDS: augmented reality, EdTech, educational software, educational technology. virtual reality.

INTRODUCTION.

The 21st Century has been pertinently called the digital century. Technology has taken over virtually all fields of our life. The business, communication, medicine, agriculture, banking, transportation, household, war sciences, space exploration have shifted to technology in one way or the other. Education is no exception where technology, termed as EdTech, has penetrated and is gaining the ground quickly.

The first world countries have applied modern technologies to the field of education and have benefitted from them greatly. Those sticking to old worn-out methods are lagging far behind. We can

still find examples of countries that bar the use of modern technology on campuses. The future cannot be predicted however technology is the present and future of this world.

As education is the lifeline of any society and social development of any society depends on education; thus, EdTech has to be given the utmost importance. The inclusion of EdTech is a sure way to bring this transformation. The implementation of EdTech is not a big challenge as many organizations today assist educational institutions to adopt and apply EdTech in their campuses. This paper explores the ways EdTech has been applied and implemented on campuses and informs policy, procedures, and practices.

The technologies which are used to assist in education are termed as EdTech (Educational Technology) collectively. According to the Association for Educational Communications and Technology (AECT), EdTech is "the study and ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources". In simpler terms it is a concept of transforming traditional book teaching and learning to digital form (Evans & Nation, 2013b). EdTech includes not only the latest gadgets but also the management and administrative technologies (Mazoué, 2012). Off course it asks for investment, in huge amounts sometimes. But it should be kept in mind that this is the investment in the future of nation. This is what David Warlick, a lead educationist of modern times has to say in this connection: “We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world”.

There are a lot of advantages of EdTech (Shaikh & Khoja, 2014a; Tenenbaum, Naidu, Jegede, & Austin, 2001). Technology defies boundaries through communication devices. It simplifies access to educational resources. It motivates students to learn more as they are much attracted to it. It improves students writing and learning skills. It makes subjects easy to learn. It increases collaboration between teachers and students. It increases students’ innovation and creativity (Fan, 2010). It prepares students

for tomorrows technological jobs (Shann, 1992). This all will enhance the educational productivity and in turn contribute to national economy. There will be more and better professionals available (Dori, 2007).

The indigenous work force will be able to perform even the most technically specialized tasks. It will help in growing exports and lowering imports, thus balancing the international trade of any nation. Considering that this article is basically targeted to developing nations, the significance of EdTech cannot be exaggerated (Cook & Kaplan, 2011).

Most Popular Trends of EdTech.

EdTech has been very successfully applied in many different ways in different parts of the world. It has established its strong footing and is used vastly. There are many trends of EdTech which developed during the recent years (Evans & Nation, 2013a; Shaikh & Khoja, 2011a).

The landscape of education is also evolving with the introduction of new technology by making best use of them. Perhaps the best use of any technology is its use in education. The latest trends in EdTech can be categorized as the following:

1- Evaluation of Learning.

2- Artificial Intelligence (AI).

3- STEAM.

4- Gamification.

5- Immersive Learning with VR and AR.

6- E-Learning.

7- Social Media in learning.

8- EdTech for students with special needs.

9- Management software.

10- Teacher Assistance.

Let us now talk in some detail how these technologies are helping to upgrade education.

Evaluation of Learning.

Technology has revolutionized the evaluation of students' learning especially in higher education. Learning analytic is relatively a new trend introduced in the field of education (Tianbo, 2012). It allows educators to measure and report student learning by using technology. It has made it possible for them to better understand and optimize learning. It is most often done by the use of web (Shaikh & Khoja, 2014b).

The student learning data is continuously updated in software or online system. It is simultaneously processed and analyzed. The strengths and weaknesses of students are vividly displayed for the enlightenment of both the educators and learners. These insights then can be used for improvement in the deficient skills and areas of essential knowledge. At the same time, a teacher can assess the effectiveness of his lesson plans and can easily see which methodologies or techniques are favourite among students. This helps to improve his teaching and to present better optimized lessons.

Learning Analytics will also help in finding out about pieces of knowledge students did not pick very well. They can be repeated and improved for future teaching. Learning analytics is of great help to educators in another way. It assists them to identify students with academic or behavioral challenges (Clarke, 2013). This allows student counsellors to work on these students. Resultantly, it serves students with problems to overcome their issues and enhance their performance (Blue & Henson, 2015).

Artificial Intelligence (AI).

AI is the cutting-edge trend in all fields. It is taking hold of almost all industries to perform tasks from very basic to advanced levels (Shaikh & Khoja, 2012).

In a year or two, it is going to be the hallmark of all services. The field of education can also benefit from it greatly. The teachers of today are looking forward to it for the ultimate upgrade of instruction. AI is a great help in the most core task of education, grading. Multiple choice, column matching and fill in the blanks type questions can be so easily marked by using AI. This automation of grades helps to save precious time of teachers, which they can spend to prepare more meaningful activities for the students. After its success in grading the objective type questions, AI is not much behind from the target of successfully grading the written questions of students (Shaikh & Khoja, 2012).

Apart from teachers, AI can assist students as well. AI tutors can be consulted when a human teacher is not available on account of some urgent commitments. A huge service to both the teachers and students by the AI is automated feedback. The system monitors the progress of students, analyzes it and enlightens the teacher and student about trends of performance (Shaikh & Khoja, 2011a). This makes EdTech an absolute necessity in future based education. Jim Flanagan noted that "we can either leave it to others (the computer scientists, AI engineers and big tech companies) to decide how artificial intelligence in education unfolds, or we can engage in productive dialogue" (Holmes, Bialik, & Fadel, 2019).

STEAM.

STEAM is an educational term. It is an acronym of "science, technology, engineering, art and math." It is a more modern and inclusive variant of STEM (Science, Technology, Engineering, Art and Math) which was first introduced by the American scientist R. Colwell in 1990s and began to be utilized actively at the dawn of 20th century.

As of today, in most developed countries - the US, Australia, the UK, Japan, Canada etc. - the popularity of STEM and STEAM-education grows invariably (Khine & Areepattamannil, 2019). It represents an integrated approach to education, whereby all scientific and technological concepts are

taught in the context of everyday life. The aim of this approach is to build a sustainable educational progression between school, university and work, and to ingrain a deeper understanding of global economy so that the future STEM-specialist is in step with modern labor-market demands (An et al., 2017).

STEAM helps students develop curiosity about the world around them. It also provides a safe environment for the learners to express and experience their ideas. It allows them to learn out of the box thinking. It is a great way to strengthen social values of collaboration and coordination (Khine & Areepattamannil, 2019).

Gamification.

So often, the educators of today come across uninterested students or classes. They find it hard to bring them to paying attention. Technology can be of great use in such situations. It has to be kept in mind that the present-day generation (known as generation Z) is the cyber generation. They are more into technology than the older people are. Even, if you consider it trivial and debase the interest of new generation in technology, believe it or not, its introduction in class will enliven them at once (Shaikh & Khoja, 2011b). There will be, suddenly, so much excitement that it will be hard to control. Learning will become fun. Even better, there could be this gamification trend.

The lessons can be designed in form of classroom games. The students will learn valuable knowledge in fun way. The atmosphere in the classroom will be positive by introducing this trend. It will be of great benefit to the learners. This technique is found more useful for the students of K-12. The reason is very obvious. Kids are more into games. They like video gaming, and a scenario of competing for higher scores can enhance learning process a great deal (Shaikh & Khoja, 2014a). At the same time, the advantages of gamification cannot be underscored in higher education to improve the engagement level of learners (McLaughlin et al., 2014). Rhine (2012) noted that “the need to know the capital of

Florida died when my phone learned the answer: Rather, the students of tomorrow need to be able to think creatively: they will need to learn on their own, adapt to new challenges and innovate on-the-fly".

Learning with VR and AR.

A picture is said to be more than a thousand words. A video is even better. Virtual Reality (VR) and Augmented Reality (AR) are also becoming popular very quickly Wong, 2013). It has made life very easy for those involved in testing and experimentation. Their introduction in education has brought revolution in learning environment. Since the demand for practical and experimental instruction has escalated, the value of VR and AR has sky rocketed. It has enhanced the interactive learning and has forced the traditional methods to go into oblivion (Shaikh & Khoja, 2014b).

VR offers a constructed reality and AR displays an enhanced view of a real image. Thus, they help to explain complex concepts that plain images or even lab's hands-on experiments couldn't show students. It is of especial value in teaching complex and abstract concepts in a concrete way. So, the students of physics can see real life movements, the students of medicine real life surgeries, and likewise the students of engineering can see their creations in real life like environment before going for the actual experimentation. Saidin, Halim, and Yahaya (2015) noted that "the advantages and beneficial uses of AR features are able to engage students in learning processes and help improve their visualization skills. The features can also help teachers to explain well and make the students easily understand what they are taught".

E-Learning.

eLearning allows students to be educated or trained electronically. It includes online materials and courses (Evans & Nation, 2013c). Students, who cannot, for any reason under the sun, take admission in regular classes, can benefit from eLearning (Shaikh & Khoja, 2011b; Zhao & Jiang, 2010). Apart

from educational institutions, the businesses also use eLearning to train their employees for required new skills. It has become the most popular among latest trends in EdTech.

Learners can use their computers, laptops, tablets or smartphones to access the study material. The process of learning becomes fun as it involves using technology. There is more variety in study materials as there are audio-visual parts included along with conventional books. eLearning is time saving, innovative and interactive for learners. In one way, the eLearning students are better off than regular class students i.e. they are not passive learners like the latter. They actively browse and select the most suitable courses for them. They have more opportunities to interact with online materials. Such students get more chances to boost their decision-making capabilities as they get more scenarios to make their own decisions from time to time.

The learners also have the freedom of home or office. eLearning is less exhausting as learners acquire knowledge through reading or viewing content (Willcox, Sarma, & Lippel, 2016). It really changes the way education is delivered. Distant learning has been around over decades, but it is now that it has truly sprouted. It is allowing educators to make use of the advantages of technology for more effective learning. The result is the recent surge in online learning courses offered by the traditional universities as well as totally new online institutions (Dittler & Kreidl, 2016).

Social Media in learning.

Who could ever imagine that social media would become part of the learning procedure! Considering that almost every student, younger or older, is endlessly involved and busy in social media, it would be a great idea to use it as a tool of education. This concept became a starting point of using social media as educational aid (Papo, 2001). Initially, it was used as a communication tool among students and teachers to enhance interaction.

Social media groups of students allow sharing of ideas, study materials and getting help from others in learning difficult concepts. There are so many educational channels on Youtube almost in all languages (Sun, 2017). Even a good educational video can go viral. Many such channels have thousands to millions of regular visitors who benefit from their videos and animations. The subject matter encompasses almost all the subjects in the world. Even the students of far off, backward areas who could not hope to study from high standard teachers, can now learn through social media. Moreover, there are so many absolutely marvelous Facebook groups and pages run by very learned people and organizations. Common people with interest in those subjects can learn a lot from high value posts. So, after all, social media is not a complete waste of time (Al-Deen, 2016).

EdTech for Students with Special Needs.

What can be safely said is that the lives of students with special needs have changed. The system of special education has been greatly reformed by the introduction of technology (Shann, 1992). The newly invented/developed gadgets to assist learning for the deaf, the blind or dumb have almost removed the burden of disability from their soldiers. The teachers of these institutions are also in much better position to develop and customize learning materials for students with special needs.

Management software.

Gone are the days when book keeping and accounts keeping had to be done manually, and huge portions of building had to be dedicated for paper record. Now a days there are a variety of management software available to digitally maintain all sorts of record. Numerous firms offer online record keeping and managing all sorts of paper work etc. Life of administrators couldn’t be easier. The tasks from attendance to time table, exam sheets and all kinds of analysis and evaluation can be done through such software or online service provider.

Teacher Assistance.

Modern technologies have resolved most of the challenges for teachers relating lesson planning and presentation. There are lesson plan templates. There are teaching aids like images, charts, tables, video files and all other types of materials to be added to a lesson.

Attractive slides can be prepared to be displayed on classroom devices. They can even benefit from heaps of readymade presentations available online. So, planning and preparation of lesson, its interesting presentation, its evaluation, assessment of students' learning, keeping record and analyzing performance- each and everything can be accomplished by using modern technology. Instead of looking at technology as a part of an already busy educational agenda, according to Biancarosa and Griffiths (2012) "technology can be conceptualized as affording tools that teachers can deploy in their quest to create young readers who possess the higher levels of literacy skills and background knowledge demanded by today's information-based society."

CONCLUSIONS.

Use of Technology in Education is a topic with huge latitude. There is of course a lot to talk about it. But one thing is for sure, technology has penetrated the field of education and is gaining ground quickly. It has put a new soul in stagnant body of traditional education.

Different technologies discussed above have broadened the sphere and spectrum of education. They have increased the access to knowledge and brought convenience for learners. It has totally changed the ways and behaviors of teachers and learners (Watson & Watson, 2013).

The word of advice is for the institutions, states and countries sticking to outdated and traditional methodologies of education. They are risking another generation to grow in older world. They should not thwart the capabilities of the young learners by forcing them to study through the same old systems their older generations have gone through.

Implementation of EdTech is not as rigorous a challenge now-a-days, since there are so many organizations working world wide to assist the institutions adopt and apply the modern technologies.

BIBLIOGRAPHIC REFERENCES.

1. Al-Deen, H. S. N. (2016). Social media in the classroom. Peter Lang International Academic Publishers.
2. An, S., Li, W., Hu, J., Ma, L., & Xu, J. (2017, August). Research on the reform of flipped classroom in computer science of university based on SPOC. In 2017 12th International Conference on Computer Science and Education (ICCSE) (pp. 621-625). IEEE.
3. Biancarosa, G., & Griffiths, G. G. (2012). Technology tools to support reading in the digital age. The Future of Children, 22(2), 139-160.
4. Blue, C., & Henson, H. (2015). Millennials and dental education: Utilizing educational technology for effective teaching. American Dental Hygienists' Association, 89(suppl 1), 46-47.
5. Clarke, T. (2013). The advance of the MOOCs (massive open online courses) The impending globalisation of business education?. Education+ Training, 55(4/5), 403-413.
6. Cook, C., & Kaplan, M. (2011). Advancing the Culture of Teaching on Campus: How a Teaching Center Can Make a Difference. Stylus Publishing, LLC. PO Box 605, Herndon, VA 20172-0605.
7. Dittler, U., & Kreidl, C. (2016). Now what are we on the threshold of "Smart Social eLearning"? In Mobile Computing (pp. 159-172). Springer Vieweg, Wiesbaden.
8. Dori, Y. J. (2007). Educational reform at MIT: Advancing and evaluating technology-based projects on-and off-campus. Journal of Science Education and Technology, 16(4), 279-281.
9. Evans, T., & Nation, D. (2013a). 12 Educational Technologies: reforming open and distance education. Reforming open and distance education: Critical reflections from practice, 196.

10. Evans, T., & Nation, D. (2013b). Opening education: Policies and practices from open and distance education. Routledge.
11. Evans, T., & Nation, D. (2013c). Reforming open and distance education: Critical reflections from practice. Routledge.
12. Fan, J. (2010, August). Application idea for TRIZ theory in innovation education. In 2010 5th International Conference on Computer Science & Education (pp. 1535-1540). IEEE.
13. Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial Intelligence In Education: Promises and Implications for Teaching and Learning. Center for Curriculum Redesign.
14. Khine, M. S., & Areepattamannil, S. (Eds.). (2019). STEAM Education: Theory and Practice. Springer.
15. Mazoué, J. G. (2012). The deconstructed campus. Journal of Computing in Higher Education, 24(2), 74-95.
16. McLaughlin, J. E., Roth, M. T., Glatt, D. M., Gharkholonarehe, N., Davidson, C. A., Griffin, L. M., ... & Mumper, R. J. (2014). The flipped classroom: a course redesign to foster learning and engagement in a health professions school. Academic medicine, 89(2), 236-243.
17. Papo, W. (2001). Integration of educational media in higher education large classes. Educational Media International, 38(2-3), 95-99.
18. Rhine, S. (2012). Is the Revolution Here?. Interface: The Journal of Education, Community and Values, 12.
19. Saidin, N. F., Halim, N. D. A., & Yahaya, N. (2015). A review of research on augmented reality in education: advantages and applications. International education studies, 8(13), 1-8.
20. Shaikh, Z. A., & Khoja, S. A. (2011a). Role of ICT in Shaping the Future of Pakistani Higher Education System. Turkish Online Journal of Educational Technology-TOJET, 10(1), 149-161.

21. Shaikh, Z. A., & Khoja, S. A. (2011b). Teachers' Skills Set for Personal Learning Environments. In Proceedings of the 10th European Conference on e-Learning, (Vol. 1, pp. 762-769).
22. Shaikh, Z. A., & Khoja, S. A. (2012, October). Identifying measures to foster teachers' competence for personal learning environment conceived teaching scenarios: A Delphi study. In Proceedings of the 13th annual conference on Information technology education.
23. Shaikh, Z. A., & Khoja, S. A. (2014a). Personal learning environments and university teacher roles explored using Delphi. Australasian Journal of Educational Technology, 30(2).
24. Shaikh, Z. A., & Khoja, S. A. (2014b). Towards guided personal learning environments: Concept, theory, and practice. In 2014 IEEE 14th International Conference on Advanced Learning Technologies (pp. 782-784). IEEE.
25. Shann, M. H. (1992). The reform of higher education in Egypt. Higher Education.
26. Sun, L. (2017, February). Discussion on the Reform of Foreign Language Teaching in College. In 2016 7th International Conference on Education, Management, Computer and Medicine (EMCM 2016). Atlantis Press.
27. Tenenbaum, G., Naidu, S., Jegede, O., & Austin, J. (2001). Constructivist pedagogy in conventional on-campus and distance learning practice: An exploratory investigation. Learning and instruction, 11(2), 87-111.
28. Tianbo, Z. (2012, November). The internet of things promoting higher education revolution. In 2012 Fourth International Conference on Multimedia Information Networking and Security (pp. 790-793). IEEE.
29. Watson, W. R., & Watson, S. L. (2013). Exploding the ivory tower: Systemic change for higher education. TechTrends, 57(5), 42-46.
30. Willcox, K., Sarma, S., & Lippel, P. (2016). Online education: A catalyst for higher education reform. Cambridge: MIT. Retrieved October 24, 2016.

31. Wong, L. H. (2013). Mobile campus touring system based on AR and GPS: A case study of campus cultural activity. In Proceedings of the 21st International Conference on Computers in Education. Asia-Pacific Society for Computers in Education, Indonesia.

32. Zhao, G., & Jiang, Z. (2010). From e-campus to e-learning: An overview of ICT applications in Chinese higher education. British Journal of Educational Technology, 41(4), 574-581.

DATA OF THE AUTHORS.

1. **Zaffar Ahmed Shaikh.** Doctor of Philosophy (Ph.D.), Faculty of Computer Science & Information Technology, Benazir Bhutto Shaheed University, Lyari, Karachi, Registrar (Acting) and Assistant Professor. Pakistan. E-mail: zashaikh@bbsul.edu.pk
2. **Muhammad Ramzan Pahore.** Doctor of Philosophy (Ph.D.), Department of Media Sciences and Communication Studies, University of Sindh, Jamshoro, Assistant Professor. Pakistan. E-mail: mramzan@usindh.edu.pk
3. **Aamir Iqbal Umrani.** Doctor of Philosophy (Ph.D.), Department of Business Administration, Sindh Madressatul Islam University, Karachi, Assistant Professor. Pakistan. E-mail: aamir@smiu.edu.pk
4. **Sumera Memon.** Doctor of Philosophy (Ph.D.), Department of Media and Communication Studies, Sindh Madressatul Islam University, Karachi, Assistant Professor. Pakistan. E-mail: sumera@smiu.edu.pk
5. **Sumaiya Jamali.** Undergraduate Student, Faculty of Computer Science & Information Technology, Benazir Bhutto Shaheed University, Lyari, Karachi, Sindh, Pakistan. E-mail: sumaiyayaqoob5@gmail.com

RECIBIDO: 9 de diciembre del 2019. **APROBADO:** 19 de diciembre del 2019.