Use of Innovative Technology for Effective Learning-An Empirical Perspective

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Abstract: From the Generation X to Generation Z continuing, TECHNOLOGY played a huge role in lifestyles. In contrast, technological innovations and advancement are having a significant impact on educational System at all levels. Recent research states that the use of technology in education has improved student's academic performance exceptionally. Several invention of innovative technologies like Cloud computing, Artificial Intelligence, Information technology, Virtual Reality [VR] and technological tools like smart pens, Digital textbooks, Virtual keyboard; aided for an effective learning among the students. Many educational institutions are coming forward in embracing technologies. For instance, they use digital whiteboards, flipped classrooms and Chromebooks replacing textbooks. Online courses, teaching aids, educational software, social networking tools and other emerging technologies are disrupting the traditional classroom environment. Understanding the effects that technological innovations have on students, teachers and management is critical to developing strategies and techniques to manage the use of innovative technology for effective learning.

Keywords: Academic performance, Effective learning Generation X, Generation Z, Innovative Technology

I. INTRODUCTION

Technology is causing massive changes in all sectors of the economy. These changes have been felt in the health sector, financial world, entertainment, and even government. The good news is that these changes will make the world a better place! One of the key sectors that has been affected by this disruption is education. These innovations are giving classrooms a new look and have changed the ways in which lessons are conducted.

Education is an important part of every society. As a student, there are sometimes difficulties that can be experienced. Since the dawn of digital systems, learning has never been easier, the educational landscape has changed drastically with increased connectivity and technology that promotes outside-the-box thinking and innovation. Classrooms at all levels are evolving to meet this "new normal" through virtual lessons, smart technology in schools and online access for students and parents.

A recent Gallup study shows that over 81% of teachers agree that they see great value in using digital learning tools in the classroom. In addition, 57-% believe digital learning tools are more effective for personalizing instruction, with a large majority thinking these are more effective for engaging students with school and learning. And almost 90% of students who have grown up alongside technology are using digital tools at school at least a few days a week.

However, educational technology (EdTech) has made its most significant strides in the age of social distancing and learning from home. Thus we can expect to see major opportunities in myriad areas along with challenges that will need to be addressed.

II. A BRIEF HISTORY OF TECHNOLOGY IN THE CLASSROOM

Technology originally made its way into the U.S. education system as a necessity to prepare for an increasingly digital future and as part of its Cold War era competition. After witnessing the launch of Sputnik, the Soviet Union's first satellite, America shifted much of its attention in education to math and science while embracing technology particular. The Vocational Education Act in 1963 funded technology use in schools. As a result, students learned programming languages like BASIC, and PCs gradually made their way into some classrooms.

Educators took two approaches when incorporating computers in classroom instruction.

The first was less common. Mathematician and professor Seymour Papert first introduced microcomputers in the classroom by teaching basic programming in the early 1980s. His Logo taught students basic programming skills. The idea was to create student-centered learning activities that required hands-on exploration.

By the mid-1980s, Apple computers had also gained a foothold in classrooms, and a more common approach to technology integration gained popularity. Teachers used Edtech software solutions: Drilling students with electronic programs. Teachers routinely assigned students to computer tasks, where learners answered an endless series of questions based on knowledge and recall.

A mere decade later, the Internet connected computers worldwide. The dramatic growth of the World Wide Web introduced email, video, and a variety of digital media. More importantly, it enabled two-way communication between anyone, anywhere, and anytime.

That connectedness revolutionized not only business and interpersonal relationships but also education. Beginning in the early 2000s, there was a greater emphasis on a new form of education: STEM, short for science, technology, engineering, and mathematics.

Computers and technology are the future — we may as well embrace them for all the benefits they bring to the classroom.

III. TECHNOLOGY IN THE CLASSROOM

There are various kinds of technologies which are discussed below –

Computer in Classroom
It is considered that having computer in the classroom is asset for teachers as well as for students. The teachers can use computer to demonstrate new lessons, new material can be presented, illustration of using new programs and showing new websites.

Class Website
It is an easy way to display student's work where a web page is needed to be designed for the class. Once a web page is designed, it is very helpful in posting homework assignments, trivia games, students work and famous quotes and many more things. At present time, each and every child knows how to operate computer and can easily navigate their way through a website.

Class Blogs and Wikis
There are number of Web 2.0 tools which are currently being implemented in the classroom programs. Blogs allow a student to maintain his/her own running dialogue. Wikis are more group focused as it only allows few members of the group to make changes in a single document. Blogs allow a student to freely express their knowledge of the information learned.

Wireless Classroom Microphones
Noisy classroom is regular scenario of schools these days, but with the help of microphones students could hear their teachers more clearly. The benefit for teacher is that they no longer lose their voices at the end of the day.

Mobile Devices
The devices such as Smartphones and Clickers are used to improve the experience in classroom in which professors get to receive the feedback.

Interactive Whiteboards
This device provides touch control of computer applications which enhances the experience in a classroom by showing different things on the computer screen. Apart from visual learning, it is interactive so that the students can draw, manipulate and write images on the whiteboard.

Online Media
The classroom lessons could be more enhanced by the use of streamed video websites.

Scheduled online classes
Google Calendar allows you to create and share a class calendar that will keep the students informed about the class, duration, announcements, and important dates. Teachers can easily email the class calendar link to the students. This will help both the teachers as well as the students to stay organized and come prepared for each class.

Digital Games
The field of educational games is growing considerably from last few years where it is provided as tools for classroom and provides positive feedback that includes higher motivation for students.

IV.   USE OF INNOVATIVE DEVICES FOR LEARNING

Smart pens: A simple yet nonetheless impressive fusing of of technology and education, the smart pen is a pen that allows you to digitally record all your notes from classes and lectures via smart software which digitalizes your written text, and a sensitive microphone which records audio. Once uploaded, smart pen programs such as the Livescribe Echo Smartpen will allow you mark any point in your digitalized text and play the audio that coincides with the time you wrote the note.

Digital textbooks: As the tablet and the e-reader become increasingly popular mainstream student technologies, so too do digital textbooks. And with the digital versions being remarkably easy to use, streamlined and lightweight, when given the choice between lugging around the complete works of Shakespeare or having them all available on one e-reader, it's easy to see why the popularity of digital textbooks is growing.

Tech backpacks: If you've ever been out and about on campus with a bag full of technology that's all run out of juice, then you might be interested in hearing about tech backpacks – bags that not only store all your student technology tidily and safely, but also allow you to charge your devices without the need for a plug socket. Running off solar energy panels on the front of the bag, tech backpacks offered by companies such as Voltaic and Eclipse are brilliant for those who can't live long without access to technology. And that's not all; by using solar power, tech backpacks are often environmentally friendly too!

Smart lights: Depending on how much time you spend inside your flat or house as a student, and how much the revision you do depends on good lighting, you might like to get your hands on a smart light. Smart light functions vary depending on the manufacturer but one example, the AwoX StriimLight, is a smart light that plugs into a socket like a normal bulb and streams music directly from a mobile device or computer via Bluetooth to play through the light's very own speakers. This acts as the perfect student technology to use at a house party or gathering (saving your laptop and speakers from inevitable spillages), or as a revision aid which allows for soft lighting and background music. And, for those of you who love a bit of ambience when studying, LIFX smart lights feature a full spectrum of changeable colors that can be changed with the touch of a button to align with your revision mood.

Virtual keyboards: Keyboards you can fold up and take with you have been around long enough for us to realize how handy they are for hooking up to mobile devices for typing on the go. But there's a newer, better innovation being bought to market… the virtual keyboard. Yeah, it's happened, and it is as good as it sounds.

Noise-cancelling headphones: While noise-cancelling headphones are great for those who enjoy listening to their music much too loud on public transport, they also act as a great way to maintain study concentration by lessening the distractions of the outside world. Whether you're revising to the quiet sounds of the ocean in the library or letting off steam with a head-banging session to Metallica at 3am, noise-cancelling headphones are a brilliant way to ensure no one will ever again be distracted by stuff they don't want to be distracted by.

Encrypted flash drives: To make absolutely sure no one steals your dissertation, invest in an encrypted flash drive/USB which requires a PIN in order to access any work stored on it. This may not solve the problem of constantly leaving your flash drive connected to the library computers, but it will hopefully stop anyone from thieving the device for themselves, as without the user-defined PIN the information held on the drive is rendered useless. One such drive is the LOK-IT Secure Flash Drive which features a PIN number display.

V.   TECHNOLOGY INNOVATIONS FOR EDUCATION

Virtual Reality (VR) in Education
It is already the hottest thing in the tech world. Big companies are gearing up for a brutal war over this technology including Google, Sony, Oculus (backed by Facebook), Samsung, and more. One of the areas of application of VR technology is education. With VR, students can learn via interacting with a 3D world. Google has been on the forefront of introducing experiential learning in schools through VR technology.

Artificial Intelligence and Machine Learning
Artificial intelligence is being applied in all levels of technology, from the lowest to the most advanced levels. AI is used in schools to automate key activities such as grading of subjects and providing feedback on areas that need improvement. It is also used to enhance personalized learning among students, especially those with special needs. Through machine learning, adaptive programs have been developed that care for the individual needs of students. AI tutors have been developed to teach students subjects such as mathematics and writing.

Cloud Computing for Education
Educational resources can be accessed from any part of the world thanks to cloud computing technology. Vital resources such as written lessons, audio lessons, videos, and video assignments can be stored on a school's cloud terminal. Students can access these

resources from the comfort of their homes and complete and submit the assignments back to their tutors. Flimsy excuses that students give for not doing assignments may be a thing of the past. Cloud computing will eliminate the hassle of carrying tons of books or practically living at your local library. This technology also allows students to chat live with their tutor.

3D Printing

3D printers are already causing ripples in the education sector and students are loving them. Content that was previously taught via text books can now be expressed through 3D models. Through this printing technique, students can have a better understanding of something that was thought to be complex. In higher educational institutions, 3D printing is used by engineers and system designers to develop prototypes to be used in the development of final systems. 3D printing takes concepts and makes them real.

Social Media in Educational Institutions

Educational institutions have not been left behind in capitalizing on the impact of social media. In fact, most of these social networking sites were developed on campuses and the first users were college students. Universities and colleges can connect with each other through social networking sites even if they are several continents apart. Through these sites, they are able to organize contests, meetings, and parties. Students from different schools use social media to exchange ideas which can change lives.

The Use of Biometrics in Schools

No more truancy and cheating! The introduction of biometric systems in schools has helped to streamline the education and enhance discipline. Facial recognition, fingerprints, voice recognition, and eye tracking are some of the biometric methods that schools have implemented to streamline their operations. Apart from being used to monitor a student's class attendance, they are used when borrowing school properties such as books in the library. Teachers use eye tracking methods to monitor how students are absorbing content that they have been taught.

VI. BENEFITS OF TECHNOLOGY IN EDUCATION

Educational technology is aimed to improve the education over what it would be without technology. Some of the benefits of use of technology in education field are listed below.

Easy-to-access course material

Instructors can post the course material or any other important information on the course website which will be helpful for the student as he/she can study at a time and location they prefer and can also obtain study material very quickly.

Student Motivation

The computer-based instructions can be helpful in giving instant feedback to the students and can also explain correct answer. In addition, computer is considered as patient and non-judgmental device which can motivate students to continue learning. According to the study of James Kulik, students grab more when education is provided digitally and also develop positive attitude towards computer in computer-based classes.

Wide Participation

Learning material is very helpful in long distance learning and also accessible to a wider audience.

Improved Student Writing

It is also suitable for students to change their written work on word processor which also helps in improving the quality of their writing. According to various studies, it is known that students are better at editing and critiquing written work which is switched over a computer network.There are various kinds of educational software which are designed to help children to teach specific subjects that are graphics software, pre-school software and computer simulators.

Differentiated Instruction

The technology in education also provides a means to focus on active student participation and also to present different strategies of questioning. It also promotes plans of personalized learning and broadens individualized instructions.

VII. OPINION OF PROFESSIONALS

Educational technologies have become more important especially in the recent years. The use of technology to facilitate learning has increased over the past decade, but relevant problems in education are still on the agenda. The aim of this study is to determine the opinions of preservice teachers about using technological tools in education. Qualitative method was used in the study. The study was applied to the 32 senior students studying at the classroom teaching department of a university in Kazakhstan. Data were collected with interviews. The interview questions were prepared to get the opinions of preservice teachers studying in the classroom teaching department regarding the use of technology in educational technology, and the questions were applied by giving the final shape by the experts in their fields.

According to the results, preservice teachers feel insufficient to use the internet and computer for teaching purposes. However, they stated that they are sufficient in using computers and internet search engines, they can prepare simple materials for teaching purposes and they can not prepare multi-purpose teaching devices. This difference can be overcome with individual research and project assignments that require preservice teachers to use technology for teaching purposes.

VIII.   CONCLUSION

The timing has never been better for using technology to enable and improve learning at all levels, in all places, and for people of all backgrounds. Educators, policymakers, administrators, and teacher preparation and professional development programs now should embed these tools and resources into their practices. Working in collaboration with families, researchers, cultural institutions, and all other stakeholders, these groups can eliminate inefficiencies, reach beyond the walls of traditional classrooms, and form strong partnerships to support everywhere, all-the-time learning. Although the presence of technology does not ensure equity and accessibility in learning, it has the power to lower barriers to both in ways previously impossible. All of this can work to augment the knowledge, skills, and competencies of educators. Tools and data systems can be integrated seamlessly to provide information on student learning progress beyond the static and dated scores of traditional assessments. Learning dashboards and collaboration and communication tools can help connect teachers and families with instantaneous ease. For these roles, too, technology allows greater communication, resource sharing, and improved practice so that the vision is owned by all and dedicated to helping every individual in the system improve learning for students.

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