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Effect of the Technology-Enabled Lesson Planning on 21st Century Skills of Students at Secondary Level

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Abstract
Technology-enabled pedagogical practices are gripping the attention of all scholastic organizations around the globe and Pakistan is no exemption in this respect. As far as technology -enabled learning environment is concerned, teacher's pedagogies has not been implemented yet particularly in public sector schools. This study explores the effect of teaching through technology-enabled lesson planning on learners' 21st century skills in Biology subject. A group of students studying Biology subject (N=177), was selected from public schools, administered by the local provincial authorities functioning under the Government of Sindh, Pakistan, who participated in the descriptive research. A regression model revealed the significant level among dependent and independent variable through the Statistical Package for Social Sciences (SPSS) version 22. Result stated the positive significance level among technology-enabled lesson planning and learners' 21st century skills. The students studying in a technology supported learning environment develop 21st century skills. The research recommended creating technology supported learning environment for students as a digital native studying Biology at public secondary schools of Sind, Pakistan. On the other hand, training for teachers as digital immigrants regarding 2.0 technology tools of teaching should be held continuously.

Keywords: ICT, TAM, Technology-enabled learning, Teacher -Centered Classroom, Learner-Centered Classroom, 21st century teaching and learning skills.

Introduction

Yilmaz (2020) set out to investigate how potential teachers with science education in pedagogy's critical and creative thinking, multidimensional 21st century abilities, and change in academic achievements. The study's findings demonstrate that incorporating technology into education gradually improves students' critical and creative thinking, multifaceted 21st century abilities, and academic performance. fields. There are many things happening right now that we could never have even imagined. People may experience both hope and worry as a result of technical advancements (e.g., digital ease, all-encompassing information access, technological applications that provide solutions, and medical advancements) (Gunuc, 2017).

Due to this circumstance, technology must be managed methodically and integrated into people's daily activities in a planned and programmed manner (Thomas & Brown, 2016). In all the eras they existed, states invested the most on the people. This investment was done through educational systems (Durnali & Ayyildiz, 2019). Many nations may have different educational systems. Their mutual objectives include "qualified workers and well-educated persons," nonetheless. At this time, technical advancements are important (Palak & Walls, 2009; Yilmaz & Aydin, 2019). But not all education takes place in classrooms. The fulfilment of education can be hindered by natural disasters, global crises, wars, international conflicts, and epidemics (Burgess & Sievertsen, 2020). The recent Covid-19 epidemic is one among the key elements covered by this study.

Our globe is currently experiencing an epidemic of the Covid-19 virus. This pandemic, which started in China in December 2019, has spread to a significant portion of the global population (Ozer, 2020). As of May 1, 2020, it is expected to have affected 4 million people and killed 280 thousand as per the most recent data. In the fight against this virus epidemic, all nations take safeguards (OECD, 2020). This approach requires the use of other forms of education known as "Emergency Remote Education," which allow the education process to use the digital infrastructure to continue. The educational system strengthens and regulates technical infrastructures during the Emergency Remote Education procedure (UNESCO, 2020).

Nyongesa (2015) explained that majority of learners only sit passively in their seats and listen 40-to 50 minutes' Biology lecture in a classroom on daily basis, but never uttering a word because most of the teachers don't promote student's discussion in their classrooms. A textbook of Biology (366 pages) for Class IX, X, (course complete in one year and assessment is taken from whole book in grade IX) is taught in all public and private schools enrolled under Board of Secondary Education Karachi, Sindh Textbook Board, Jamshoro publish by Urdu Academy Sindh, Karachi. At grade IX two period per day, ten periods for a week allocated for biology subject. Biology is taught in local languages in Pakistan. In Karachi, 80 percent public schools are Urdu medium some students who come from private sector, study in English and rest of schools are Sindhi medium. Teachers use Urdu as main language and use English language where necessary,

conventional teaching method (chalk and talk) is used in classes. Two periods with duration of 35 minutes each, was not only headache for learners but tedious too. At public sector school in Karachi, researcher as a Biology teacher observed the same situation in her teaching sessions.

The only reason was explored that learner sit passively in the class and even teacher did not allow learners to discuss the topic as teacher understood that discussion is just waste of time. Researcher discussed her experience of training at USA, with Biology teachers when she got a chance to visit Irvin (2007) further explained that ICT is commonly referred for all technological tools, application and framework of technology tools that connect people and organization. For instance, smart cell phone, smart television, PCs, 4-G networking, Social networking and software, hard wares, robot, email.

In 2005–2006, there was a "revision" of the curriculum for all grades and topics. The teaching methods and preferred practises of teachers in mainstream public secondary schools unquestionably have an impact on students' academic achievement, and these teachers are crucial to achieving educational objectives. In the educational environments for mainstream public secondary school students, research has a significant impact on changing teaching methods. In the current situation in Pakistan, teachers in public schools have little options to attend workshops and short courses to improve their specialised teaching abilities. As a result, teachers in the public sector are less likely to be aware of cutting-edge teaching techniques that can be used in a technology setting. Many researchers and philosophers throughout the world are interested in the usage of technologically based teaching methodologies in secondary schools. This expanding trend toward making technologically based instruction

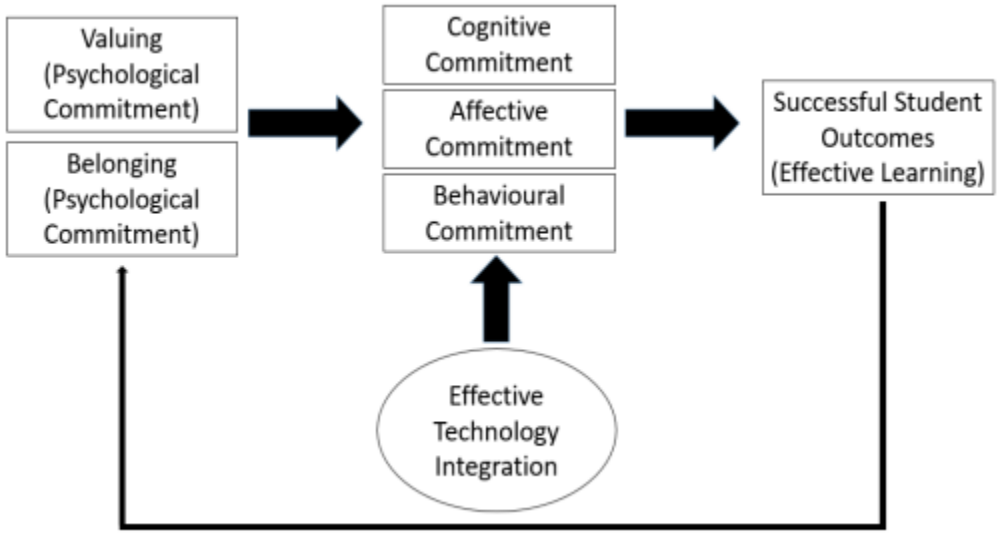
This growing propensity to include technologically based instruction into daily classroom instruction is now following a tradition in Pakistani classrooms.There are currently many factors being taken into consideration to improve the use of technology in education, which has become a global phenomena. Without the innovative use of technology and its connected improvements, academic activities such as teaching, learning, and testing are lacking. The performance expectation, outcome likelihood, and social inspiration of 388 master's level students using web-based facilities were found to be important determinants of their social intention by Arif et al. (2018).

Rashid and Asghar (2016) noted that given the widespread use of technology, it is crucial to incorporate it into teaching and learning for specific reasons. Rashid and Asghar also discovered a connection between the use of technology and students' participation in the teaching-learning process and their ability to pursue independent learning. In their 2017 article, Khokhar, Gulab, and Javaid highlighted how technology and education might be mutually beneficial. With Pakistan's increasing use of technology, classrooms are increasingly a hub of pedagogical experiences.According to research by Khokhar et al., out of 120 certified secondary school teachers, 75% were not prepared to use technology as a teaching tool in the classroom. Of these, 21% said they were ready to instruct students using technology. Teachers in public sector schools view the technological environment as a significant challenge and a mismatch with their teaching philosophies. Information and communication technology has significantly increased the amount of instructional material used in classrooms.

Theoretical framework

Within the parameters of the study, the "Engagement and Technology Integration Theory" created by Gunuc (2017, p. 22) was utilised as the theoretical framework and technology integration models. The micro level of technological integration is covered in this idea. There have been both in-class and outside-of-class teaching and learning activities developed. This philosophy does not just have the teacher as its foundation. The centre is occupied by both the teacher and the pupil. The theory's core tenet is to clarify how technology integration and student involvement are connected to academic success and efficient learning. Student engagement is defined as "the quality and quantity of the student's psychological, cognitive, affective, behavioural responses and energies to participate in the learning process, academic, and social activities inside/outside the classroom," according to Gunuc (2017, p. 22).

Figure 1.
Engagement and Technology Integration Theory (Gunue, 2017, p.23)



Objectives
1.To examine the effect of teaching while using technology as a teaching tool on learners' skills of 21st century.
2. To examine the needs of learners as a Digital native during Biology learning process of Public secondary school students.
3. To examine the need of ICT teachers' training in public secondary school for teachers as a digital immigrant.

Research question
1.What is the effect of teaching while using technology as a teaching tool on learners' skills of 21st century?
2. What is the needs of learner as a Digital native during Biology learning process of Public secondary school students?
3.Why there is a need of ICT teachers' training in public secondary school for teachers as a digital immigrants?

Hypothesis
H_0: There is not a significant relationship between technology enabled lesson planning and students 21st century skills.
H_1: There is a significant relationship between technology enabled lesson planning and students 21st century skills**.**

Literature review
Child as a Digital Native
The 21st-century youngster opens his or her eye in a digital environment, making today's child a digital explorer who learns about phenomena and conducts investigations using digital instruments like the internet, mobile phones, iPads, and other types of digital engagement. Therefore, Green et al. (2005) propose that the educational system be modified by matching its elements to learners' skills, interests, abilities, and needs as cited in Desjardins (2011). According to Rideout (2010), the generation of learners who are commonly referred to as "digital natives" are distinct from all previous generations. Today, Since kids begin to be influenced by digital media even as their brains are still developing, learners live in a digital environment. According to Prensky (2010), students in the digital age only read books for 5,000 hours in their lifetimes, play video games for 10,000 hours, and watch television for nearly 20,000 hours. Both students and teachers encounter many difficulties as soon as they enrol in a system of education. One such issue is teachers' ignorance of the educational demands of digital learners (Rikhye et al., 2009). Thus, it is essential that teachers comprehend the learning requirements of digital learners and acquire the necessary information and abilities in order to set up a technology-enabled learning environment for the students (Rashid & Asghar, 2016).
Training pupils to adapt to the technological environment is essential given the world's rapid technological transformation. Since the lives of today's students are dominated by digital media at a time when their brains are still developing, Thompson (2012) looked into the claims made in the popular press regarding the digital native generation as learners.

Numerous writers for the popular press have come to the conclusion that students of this generation have better thinking and learning skills than students of any previous generation.
The teachers were pushed to alter their methods of instruction in order to deal with the kids of this generation, but there was little proof to back up their statements. In order to determine trends in technology utilisation, this study conducted a survey to collect information about how 41 technological instruments were used by university freshmen. The results showed that there were some positive connections and some negative correlations between the usage of digital technologies and digital traits. The relationship between productive learning is most significantly negatively affected. Instant messaging, messaging apps, and fakebook are habits. Researchers like Kóczy et al. (2008), Bennet and Maton (2019), the general recommendation for changing the educational system for a child who is a digital native was developed by Kalolo (2019). Electronic media were suggested for the teaching-learning process by Manaseer, Alawneh, and Almogdady (2019) because they place more emphasis on sound, creativity, and image than on the dry text on the page. According to Prensky (2001), computer games in particular are a crucial part of digital natives' leisure time activities and help learners build their capacity for complex thought. The 21st century generation, according to Chalkiadaki (2019), introduces a playful approach to the workplace. The desire to combine play and work might cause tension with teachers who, according to tradition, advise students to finish their assigned work before engaging in any play.
According to Prensky (2001), technology, as well as realistic films and television shows, has given kids more opportunities to develop their fantasy skills and engage in role-playing, and students will be more engaged if these fantasy contexts are introduced into the classroom. Technology can improve conceptual knowledge when used appropriately, according to Mahmood et al. (2018). The usage rates for academic study were generally low, according to a comparison of technologies and activities carried out as part of students' regular lives and their academic study.
Before changing any courses or instructional levels, policymakers should take in mind that access utilisation of technologies is varied. After a quick investigation, it was concluded that today's youngster differs significantly from the child of the previous two decays.

Teacher as a Digital Immigrant

Today teacher in 21st century, in Pakistan or all over the world considered as digital immigrant. A number of researches have been conducting on digital learner and digital immigrant teacher in social sciences to improve the quality of education. Labbas and Shaban (2013) stated that this world is rapidly changing communication techniques, culture, and education, in this scenario, it is essential for the teachers to get familiar with this new educational changes. According to Fullan (2006), change in communication techniques can be effected by fear and thus, some teachers might not happen this change. Prensky (2001) stated that people born before this new digital era, which began around 1980, as digital immigrants. According to Prensky, digital immigrant may get to know about the latest technologies, but they will be somehow stuck in their past and are not able to fully understand the natives.Thakur (2014) elaborated that in India, frustration is being developed among the public schools teachers due to digital divide between public and elite schooling system. As ICT is penetrating in all fields of human life but public schools still no facility even teachers are also not trained for it, this alarming situation created a gap and in this scenario, even educational policies are not implemented as education policy demand quality education. Researcher demand efforts for reduce the digital divide.Rikhye, Cook and Berge (2009) stated that teachers of today's student at some point fail to understand the way of learning a young student prefer to adopt. Their findings with 33 subjects in two groups, clearly showed that a course who used web media scored 20% better than the course who used web voice and print. However, it indicates that digital natives probably learn differently from digital immigrants. Prensky (2001), Prout and James (2015),Osakwe (2016), Harari (2018) and Trask (2019) agreed that 21st century teachers have a duty to adopt new methods and re-constitute themselves in order to remain relevant. Carver (2016) stated that a barrier has been constructed between the teachers and the students, which is to be breached and it is the major responsibility of the teacher itself . Wood (2010) stated that there would be an incorporation between teaching practices and web 2.0 into educational theory. He further suggested that teaching in teacher educational programs must be done through technological tools.

Methods

By purpose it is applied research. Postpositive knowledge claim support quantitative research approach. This study described the relationship of independent variables with dependent variable. The regression model will explain the relationship IV and DV.The current research study has a deductive approach. In this research one hypothesis will be tested by SPSS. It is a survey-based research study in which public school secondary teachers have been chosen as a respondent. It is based on natural environment settings. It is a cross-sectional investigation. 08 months will be taken for this examination. Longitudinal examinations contrast from one-off consider. In this study two variables have been selected. Technology integrated lesson planning is an independent variable, students' 21st century skills is dependent variable. There are 20 items in the close ended questionnaire to measure variable. All the items have 05 sub-scale such as e. g. 1

(strongly disagree) to 5 (strongly agree). For this research, we will collect the primary source of information by floating survey form to the respondents. All the teachers of public secondary schools of Pakistan are the population of this study and the target population will be 10 private school of Karachi.
In this research study simple random sampling has been used. From 10 public school of Karachi Sindh. 150 teachers has been chosen as a target sample. online questionnaire floated among social circle to gather the required responses. Descriptive and inferential statistics will be applied. For analysis reliability, correlation and regression test has been used through SPSS latest version.

Findings

Table 1.
Reliability Statistics

Cronbach's Alpha	N of Items
.795	20

Showed the value of Cronbach's Alpha which is (α = .795) this value is acceptable for items reliability which shows that all the items of questionnaire are 80 percent reliable.

Table 2.
Correlations

		TELP	21SS
TELP	**R**	1	
	r2		
	P		
	N	330	
21SSK	**R**		1
	r2		.733**
	P	,	.000
	N		330

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 showed an extreme value of -1 and 1 which indicated a perfectly linear relationship. The dependent and independent variables have perfect positive linear relationship.

Table 3.

Regression Model Summary[b]

Model	R	r^2	S. E	D-Watson
1	.989[a]	.885	1.46649	1.769

a. Predictors: (Constant), **TELP**

b. Dependent Variable: **21SSK**

Table 3 showed the value of r^2 which is 885. This value showed that model is explained 88%. On the other hand, table showed the value of R square which showed that model is fit. The F value n the table shown is 74.510 at .000 significant level which is less than 1%. This confirmed the fitness of model.

Table 4.
Hypothesis testing

H 1	V	C	t	p	Decision
H1: TELP has a significant relation with 21SSK	Con SB	.342	6.435	.001	Accept

H1: There is a significant relationship between technology enabled lesson planning and students 21st century skills.
Table 4.10.4 showed the t- value which is 5.079 and p value which is .000 less than 0.05. That is .000. It means that H1 is accepted. The current study revealed that technology enabled lesson planning has a significant relationship with students 21st century skills.

Conclusion and discussion
Web 2.0 helps teacher and learner to avail more user-generated content. Web 2.0 technology tools reveal the 21st-century Internet applications. This new version allows university students and teachers to actively participate in the learning process. Shaikh (2017) found that University students were now able to comments, review, share and think critically any time and in any place. Web 2.0 also gave rise to web apps, self-publishing platforms like WIKI, as well as social media sites. Examples of Web 2.0 sites include Wikipedia, WIKI, Facebook, Twitter, and various blogs, which all have transformed the way the same information is shared and delivered.
The converting nature of these rising technology has promoted advancements in getting to know styles and ubiquitous mastering is on trend. Ubiquitous mastering also referred as u-studying is a studying paradigm wherein newbies have get entry to statistics at whenever and anywhere regardless of their geographical location or information thru technology. David (2017) revealed that technology aided learning is said to be an expansion of previous mastering paradigms as traditional gaining knowledge of has been upgraded to electronic studying and from digital studying to mobile studying and now, we've shifted to ubiquitous gaining knowledge of. Ubiquitous learning takes location in a ubiquitous computing surroundings, which is predicated on cellular gadgets and Wi-Fi gadgets, and wireless networks at any time in any place. Ali (2017) found that in 21st century students are technology natives and teachers are technology immigrant. U learning helps teachers to provide technology integrated learning and develop 4Cs (Critical thinking, Creativity, Collaboration & Communication) of 21st century skills. To develop 21st century 4Cs, most of the university teachers may struggle and tried to inculcate technology web 2.0 tools in their teaching and learning process. Noreen (2016) explored that teaching is very difficult process in 21st century because they are trying to teach digital natives learners. Most of the learners wanted to use technology and demand technology assisted learning from their teachers.

Recommendations
Teachers Training
Abrar (2022) observed that this usual boom in technology has made computer systems more energetic. The computers correctly exchange from desktops to small portable cellular gadgets, which twisted a brand new era of ubiquitous computing that made handy computers anywhere with extra first rate notion and knowledge of the encompassing surroundings via sensors. Mark Weiser coined the time period “ubiquitous” inside the 90s, ensuing in numerous clever gadgets together with smartphones, smartwatches, and clever tv being utilized in various situations. As an instance, wearable devices (smartwatches, bands, and so forth.) are nice in fitness-associated applications and others. Customers’ gestures are required as they are continuously connected to the pores and skin and stuck on the human body. Like other fields, consisting of commercial enterprise, fitness, and leisure, these devices have greater capability to be efficaciously and successfully exploited to enhance schooling great. One such prominent instance is sensible wearable devices for instructor orchestration. These technologies are utilized for teaching, mastering, and orchestration in a getting to know surroundings.
The significance of need primarily based instructor schooling for online coaching and development of ubiquitous studying environment. Shammi (2020) revealed that the COVID-19 pandemic has affected each issue of human lifestyles globally. Recognizing it as an existential risk, governments round the world have taken strict public fitness measures (e.g., curfews, journey bans, far flung offices, lockdowns, social distancing, isolation, quarantine, and many others.) to save you the spread of the virus. Anwer (2020) observed that e-gaining knowledge of has been adopted as an opportunity coaching and getting to know method to conventional face-to-face training. Ramiij (2020) found that most technologically superior nations have all of the equipment wanted for on-line training, the least advanced international locations (LDCs) and developing countries have faced a massive task to conform the new normal state of affairs. Zalat (2021) explored the motive, in maximum developing nations, e-gaining knowledge of changed into underutilized before the pandemic because

of a loss of ICT knowledge, poor community infrastructure, weak point in content improvement, and so on. Rahmadani (2022) analyzed the consequence, growing nations that were in particular focused on traditional face-to-face instructions encountered numerous demanding situations (e.g., instructors', college students', institutional, infrastructural, technological, and logistical) on this sudden transition. However, this examine generally specializes in the challenges confronted by using teachers of primary and secondary degree institutions in Bangladesh all through the COVID-19 disaster and discusses the feasible answers.

Implementation of web 2.0 Teaching online tools

Scull (2020) observed that COVID-19 has changed the global schooling machine for all time. International locations round the sector had been compelled to undertake e-getting to know in place of a face-to-face education system. Even though distance coaching-studying techniques showed a regular developing tendency because of COVID-19, teachers have been not prepared sufficient to train on-line due to this sudden transition. Consequently, this surprising shift from a traditional face-to-face coaching-studying surroundings to a completely on line environment has not been smooth. Allen (2022) explored that to keep students concerned in studying, the speedy transition to on-line mode has ended in appreciably elevated workloads for instructors, as well as trouble and warfare to evolve to this "new normal" scenario throughout the globe. Amin (2021) observed that the existing literature on COVID-19's effect on the education region is normally descriptive and specializes in the demanding situations that teachers confronted when transitioning to online teaching, in the main in the better training zone. This observe meant to explore the demanding situations confronted with the aid of primary and secondary level instructors of Bangladesh even as coaching on-line and ability manner to deal with those problems.

This includes the use of social networking sites and media sharing offerings to talk and percentage their blogs, photographs and videos with circle of relatives and buddies. In recent times, students are attracted to the interactivity that these generation tools provide for the social elements of clean verbal exchange and online expression of personal identities. Internet 2.0 gear provide opportunities for newcomers to take control in their getting to know and facilitate collaborative ways of working, mission creation, talk and knowledge sharing. With those talents, many instructors now are exploring the use of internet 2.0 technologies as a coaching tool. Teachers who use those gear provide skills to assist communique, facts literacy and encourage collaboration amongst students via the use of wikis, blogs, social networking.

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