Teachers and students Technological Awareness and Classroom Practices

Dr. Maksal Minaz (Corresponding Author)
Lecturer, Department of Education, Abdul Wali Khan University Mardan.
Email: maksalminaz@awkum.edu.pk

Dr. Mehwiah Habib
Demonstrator, Department of Mathematics, Abdul Wali Khan University Mardan. Email: mehwishabib1983@gmail.com

Mrs. Ghazala Naheed Baig
Lecturer, Department of Education, Abdul Wali Khan University Mardan.
Email: ghazala@awkum.edu.pk

Abstract

The study aim was to investigate the 21st century technological awareness of teachers and the classroom practices of students at secondary level. The research objectives were; to find out the awareness of the 21st century school teachers regarding the technological literacy and to co-relate the 21st century technological awareness of teachers and the classroom practices of students. For the achievement of research objectives number of two hundred and eighty two (282) secondary school teachers and three hundred eighty (380) secondary school students (class 10th) were selected through Raosoft online sample size calculator for the purpose of data collection. Self-developed technological Literacy Questionnaire (TLQ) was validated and the reliability was found to be Cronbach's alpha α = .938. Analysis of the data was done through SD, *t*-test, Pearson Product Moment Correlation, at the 0.05 level of significance. The findings revealed that 21st century teaches possess the necessary technological experiences to incorporate and utilize computers through teaching and learning, ultimately leading to improved student performance in the classroom. The results revealed strong correlation was found between technological competencies of teachers and the classroom performance of students, with a significance level of 0.01. It was concluded that both secondary school teachers and the students possess a high level of technological experiences, which positively impact the performance of student at secondary level. Consequently, it was recommended that the government take substantial measures to enhance the technological skills of 21st century teachers and provide the regular training sessions to improve the classroom performance of student.
Key Words: 21st century, literacy, Technological Awareness, Classroom Performance.

Introduction
According to Reeves, (2022) the 21st century curriculum and educators rely solely on technological competence and expertise to keep pace with the world's progress and foster national development. Our lives have become so entwined with technology that it seems absurd to consider completing even the most basic,

everyday tasks without the digital Aids (laptop computer, cell phone, or personal global positioning system, or GPS). Young generation among the most regular consumers of technology, even though individuals of all ages are using it more and more for everyday chores Downes and Bishop, (2012).Undoubtedly, technology is transforming education in the same way that it has altered many elements of our daily lives. Technological advancements facilitate access to information and make it easier to convey, but they do not alter the message pupils receive or their capacity to understand and remember it (Norris, 2012). Technology enhanced learning (TEL) is the term used to describe the use of technology in the classroom to improve the learning process (Dror, 2008). According to (Karehka, 2012), the integration of technology based learning into our teaching and learning process enabled the teachers to use technology for the positive productivity of knowledge during their students' classroom activities and to convert the students towards critical thinking and creativity.

According to Siddiq, Gochyyev and Wilson (2017) technological advancements have recently demonstrated that they provide excellent prospects for the teachers and students in variety of fields. Through the use of technological based instruments the instructors easily access to the essential information on learning instruction. According to Özeren, (2023) the usage of technology allows the required information to be distributed broadly in the least amount of time. As a result, teachers are literate enough to use the technology effectively in their teaching and learning process which may bring unbelievable changes in classroom performance of secondary school students. As Costley (2014) stated that technology is significant to students because new technologies are emerging quickly on a worldwide scale. Technology offers important educational opportunities it provides the students the chance to work together with their classmates so that they can benefit from one another. These elements working together can have a favorable effect on the motivation and learning of students. When you concentrate on giving students several opportunities with a tool over the academic year, especially if the tool is unfamiliar to them, this brings a lot of positive change in the student's classroom performance (Minaz, Tabassum & Idris, 2017).

Literature Review

According to Baylor and Ritchie (2002) for more than twenty years, educational scholars have struggled to determine the usefulness of technology in classrooms. Our developing knowledge of how technology enhances student learning is part of the problem. Rapid technological development hinders research. Van Laar, Van Deursen, Van Dijk, and De Haan (2017) stated that while many elements in a setting as complex as a school make it difficult to establish the pure isolation needed to pinpoint cause and effect, the degree of teacher receptivity to change has often been shown to be an important predictor (Gut, 2010). It seems that educators who are open to change, whether it comes from the administration or their own initiative, may readily use technology to help students acquire new material and cultivate higher order thinking skills. It also showed how these teachers' technical proficiency and morale increase when they use these resources. As (Okojie, Olinzock & Okojie-Boulder, 2006) technology based learning environment is perceived to be difficult, and as such, teachers require assistance in integrating technology integration. Our reliance on technology for

survival has made it critical for teachers to learn to build positive mindsets towards the use of technology in the classroom (Gut, 2010; Jewitt, 2012).

The studies collectively suggest that secondary level student's exhibit varying degrees of technological proficiency, with some demonstrating adequate levels of digital literacy (Gut, 2010; Jewitt, 2012; Jan, 2018) while others show that digital literacy and 21st-century skill levels are not very high. Interestingly, despite the general proficiency in technology use, there are disparities in digital literacy based on demographics such as gender, locality, and parental education levels (Özeren, 2023). Additionally, there is a notable emphasis on the importance of digital literacy for students with intellectual disabilities, suggesting that technological proficiency is crucial for a wide range of student populations Ali, Minaz and Irshadullah, (2023). Contradictions arise in the context of the pandemic, where some students in Indonesia experienced "technology stuttering" and struggled with online learning due to inadequate digital literacy skills (Arsari, 2022; Putra & Rullyanti, 2023). This highlights the gap between the perceived proficiency and the practical application of digital literacy in educational settings. Moreover, the studies indicate that while students may have the skills to use technology, they may not always apply these skills effectively to support their learning, particularly in the context of English language learning (Arsari, 2022; Putra & Rullyanti, 2023).

According to Raja and Nagasubmarani (2018) the technological advancements such as computers, cameras, projections, 3D modeling, instructional software and power point presentations are not only a useful tool for educators but also facilitate students' understanding of concepts. As a result, instructors now have an obligation to stay up to date on industry advancements, further their own professional development, and apply their knowledge of the subject in the classroom. When examining the research on digital literacy, pedagogical competencies, and technological pedagogical content knowledge on their own, teachers have the requisite knowledge and abilities. But research on teachers' technological, pedagogical, and digital literacy using a comprehensive approach is few, as the literature demonstrates.

According to Van Laar, Van Deursen, Van Dijk, and De Haan (2017), numerous factors in an atmosphere as rich as a school hinder the pure isolation required to identify causes and effects, and the degree of teacher openness to change has been proven to be a crucial predictor variable. Teachers, who were receptive to change, whether forced by administration or initiated by them, appeared to easily adapt technology to assist pupils in learning content and develop higher-level thinking abilities. It also showed that when teachers embrace these tools, their technical abilities and morale improve.

Problem statement

Technology integration

Faculty must use technology resources into their classroom instruction as soon as they become accessible in order to improve stdent learning. Thus, measuring the use of technology to enhance student learning presents a difficulty for researchers (Roblyer & Knezek, 2003; Strudler, & Wetzel, 2011). There is a paucity of research on students' impressions of computer technology use and how it affects their learning, despite the fact that several studies have examined the elements that facilitate technology integration into education as well as the

obstacles to it. Research in this area is still in its infancy, especially that which focuses on classroom instruction, despite the growing public interest in the use and integration of computer technology in education. Furthermore, the speed at which educational technologies are developing outpaces our existing understanding of how best to use computers in the classroom (Allen, 2001), which highlights the need for a study like this one. It is implied that knowledge of contemporary technology integration methods is necessary to assist student learning by the push to transform education through technology integration (Becker, 2001) and the focus on helping students build information literacy abilities (Rockman, 2004). Thus, the goal of this research is to clarify how faculty technology integration and technology literacy affect students' understanding of instruction.

Teaching Competency

Competence is defined as "the knowledge, skills, and fundamental values that are reflected in one's thought processes and behavior patterns, or the requirements for the knowledge, abilities, and attitudes that an individual must possess and apply. The knowledge, skills, and capacities of an education in presenting learning information to its pupils are known as teaching competency alone. Since this competency is fundamental to teaching and learning and influences the outcome of a process, all educators need to possess it. As (Habib, Ullah&Minaz 2023)discussed that increasing teacher competency and awareness of technological tools is the primary goal of 21st century education system. He also mentioned that the instructor is currently dealing with pupils who are in the twenty-first century. Because they are so near to the advancements in science and technology and require a teacher to provide a balance between the current and past teaching methodologies.

Statement of the Problem

Due to COVID-19 the world was totally changed. These changes were take place in the field of trading; business as well as the system of education was also converted from traditional to digitalization. For this reason it was very important for traditional teachers to enhance their teaching skills to serve as a remarkable and skillful teacher. The advancement of information and technology was one of the major factors that influenced and improved the competencies and experiences of secondary school teachers to improve the classroom performances of students. Therefore, the current research study was concentrated to find out the 21st century technological awareness of teachers and the classroom practices of students.

Conceptual Framework of the Study

DIALOGUE SOCIAL SCIENCE REVIEW
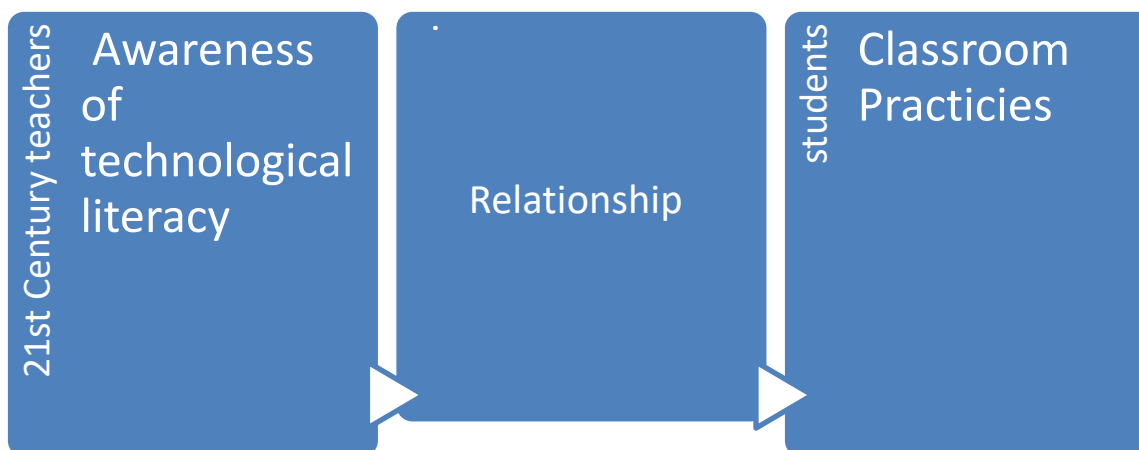
The above figure demonstrates the conceptual framework of the study related to the awareness of the 21st century teachers related to technological and its relationship with the classroom performances of students.

Objectives
Following were the research objectives of the study;
1. To find out the awareness of the 21st century school teachers regarding the technological literacy
2. To co-relate the21st century technological awareness of teachers and the classroom practices of students.

Research Question
The study aimed to answer the following research question;
1. Is there any awareness of 21st century teachers regarding the technological literacy at secondary level?

Hypothesis of the study
The following null hypothesis was tested;
1. H$_0$: There is no significant connection between the technological awareness of teachers and the classroom practices of students.

Significance of the study
The research study is significant with respect to the importance of technology and its effectiveness during the process of teaching and learning. As the previous research studies collectively suggested that secondary level students exhibit varying degrees of technological proficiency, with some demonstrating adequate levels of digital literacy (Jan, 2018). Therefore the study is significance for the stakeholders in the field of teaching and learning that is teachers, students, community, and bureau of curriculum, professional training institutions and higher educational institutions for the reason that technological proficiency is the

dire need of the day. The study is important for future researchers to conduct such type of research adopting the mix method research and qualitative research to promote the importance of technological proficiency in the wide-ranging filed of education.

Methodology
The nature of the research study was quantitative and the deductive approach was used. The philosophical base of the study was post-positivist paradigm which support that there are multiple realities exist in the word (Ryan, 2006).

Population
As the study was conducted in the Khyber Pakhtunkhwa province of Pakistan therefore the population was comprised of all boys' secondary schools of Khyber Pakhtunkhwa. According to the data of EMIS 2020-2021 the total numbers of six thousand two hundred and eighty four secondary school teachers and the total number of eighty eight thousand nine hundred and seventy three boys students were the population of the study.

Sample and data collection tool
For the achievement of research objectives number of two hundred and eighty two (282) secondary school teachers (SSTs) and three hundred and eighty (380) secondary school students only class 10th students were selected through Raosoft online sample size calculator for the purpose of data collection. Self-developed technological Literacy Questionnaire (TLQ) was validated and the reliability was calculated through SPSS s the Cronbach's alpha found to be $\alpha = .938$. Statistical analysis of the data was completed by Mean, SD, t-test and Pearson Product Moment Correlation, at the 0.05 level of significance.
Categorization of Mean scores
Low: A mean score falling between 0.0 and 0.9 is regarded as low.
Medium: Mean scores fall into this category when they fall between 1.0 and 1.9.
High: A mean score is defined as one that falls between 2.1 and 2.9.
Very High: Average scores between 3.0 and 3.9 are regarded as very high.

Table 1: Awareness of the 21st century teachers regarding the use of technological literacy

Use of Technological literacy	Teachers N=282	
	Mean	S. D
Students take interest in ICT assimilated classrooms	1.79	.81
By the help of technology I can easily monitor the Progress of students	2.08	.79
I have knowledge to use smart boards in the classroom	2.74	1.2
Professional exercise is required for developing technological proficiency in the classrooms	1.79	.85
ICTs in classroom can never be ignored	1.73	.89

Vol. 2 No. 4 (November) (2024)

Through the awareness of technological tools I can easily practice the digital tools in the classroom	1.80	.76
School administration support the use of ICT in the classroom	2.20	.90

The above table 1 showed the mean scores and standard deviation of teacher awareness of Technological Literacy (TL). The statement "students take interest in ICT assimilated classrooms" were find medium mean score(M=1.79 and SD=.81), the mean score of the statement "due to technology can monitor the students' Progress" were (M=2.08 and SD=79) showed high mean score. Furthermore the mean score of the statement "I have knowledge to use smart boards in the classroom" (M= 2.74 and SD 1.23) showed high score according to the mean categorization on the other hand teachers were also support the statement regarding the need of professional training to increase the technological proficiency of the teachers and the mean score were found medium(M=1.79 and SD=.85), "ICTs in classroom can never be neglected" were found medium (M=1.73 and SD=1.89)and in response to statement "Due to technological Literacy I can easily apply digital tools in the classroom" were found medium(M=1.80 and SD=.76), and "school administration support the use of ICT in the classroom" (M=2.20 and SD .90) showed high mean scores. Hence the mean results showed that the awareness of teachers were medium to high therefore it is concluded that the 21st century teachers were high level of literacy and they can use the technological tools in the real classroom situations. Furthermore there were positive administrative supports to adopt technological devices in the classroom to enhance the learning capabilities of students (Raja & Nagasubmarani, 2018).

Table 2: The awareness of 21st century teachers and students regarding the technological experiences

Technological Literacy	Teachers		Learners				Table t-value Cohen's d E. Size
	Mean	S.D	Mean	SD	t-test	df	
I appreciate ICT integrated classrooms	1.79	.81	2.78	1.44	11.19		0.85
ICT is helpful for students to become global citizens	1.99	.81	2.63	1.24	8.10		0.61
Using smart boards in classroom	2.74	1.23	3.28	2.91	3.25		0.24
Need of Training to enhance technological experiences	1.79	.85	2.33	1.15	7.01		0.54
I can easily apply technological tools in the classroom	1.80	.75	2.40	1.30	7.49	660	0.57
Encouragements to use apply technological equipment's in the classroom	1.88	.84	2.75	1.23	10.86		0.82
School administration support the use of ICT in the classroom	2.20	.89	2.85	1.40	7.25		0.55

1.960

The above comparative analysis (table 2) showed the perceptions of 21stcentury teachers and the student's with respect to technological literacy at secondary school level. In addition to the degrees of freedom (df), *t*-test results, standard deviations, mean scores, and Cohen's D effect size were calculated. The above analysis showed that the responses of teachers were (Mean=1.79) and the mean score of the responses of students (Mean=2.78) were significantly different perceptions, effect size was showed large size (Cohen's d=0.85) which support the results. The difference of the mean showed that students were literate to use Information and Communication Technologies (ICT) in the classroom. It was found that students were more potential for Information and Communication Technologies in global citizenship. Because teachers (Mean=1.99) and students (Mean=2.63) have different views with a moderate effect size (Cohen's D=0.610). Teachers and students have somewhat different opinions about smart board presence, teachers (Mean=2.74) and students (Mean=3.28) have a slight difference with a small effect size (Cohen's D=0.241). Students believe more in the need for training such that teachers (Mean=1.79) and students (Mean=2.33) significantly differ with a moderate effect size (Cohen's D=0.54). There is a moderate gap between the teachers and students application of technological tools in the classroom because teachers (Mean=1.80) and students (Mean=2.40) significantly differ with a moderate effect size (Cohen's D=0.567). Students were more confident to encouraged the use of technology in the classroom therefore the teachers (Mean=1.88) and students (Mean=2.75) significantly differ, with a large effect size (Cohen's D=0.823). There is a moderate gap in how they view administrator support for technology use because teachers (Mean=2.20) and students (Mean=2.85) differ with a moderate effect size (Cohen's d=0.553). The results of *t*-test for all the statements were found significant which showed that both the students and teachers were experienced the technological classroom.

Table 3: Association between the technological awareness of teachers and the classroom practices of students

		Technological Awareness of Teachers	Classroom Practices of Students
Technological Awareness of Teachers	Pearson Correlation	1	.272**
	Sig. (2-tailed)	---	.000
	N	662	662
Classroom Practices of Students	Pearson Correlation	.272**	1
	Sig. (2-tailed)	.000	---
	N	662	662

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

The above table 3 Pearson *r* analyses illustrated that connection between the technological awareness of teachers and the classroom practices of students was a weak positive association. Therefore the Pearson Correlation coefficient

between teacher technological awareness and the classroom practices of students was found to be 0.272. The results indicated that there was a weak positive correlation was found and the correlation is statistically significant at the 0.01 level (2-tailed). Thus, it was concluded that the weak association between the variables may be due to the absence of continuous professional development of teachers. Therefore weak positive association indicated that the null hypothesis was rejected.

Discussion

The findings showed that secondary school instructors were conscious about the application of technological tools in the teaching space and technical literacy of teachers encouraged students to employ their creativity in the physical world settings. Many scholars and professionals were supported the use of technology in the teaching and learning process (Ahmad, Minaz, Shah, Baig, & Rashid, 2021; Raja & Nagasubramani, 2018; Minaz, Tabassum, & Ahmad, 2018). The results also indicated that the students were also support the awareness of teachers regarding the technological literacy and they usually practice the tools for the learning process in the classroom. The researchers discussed that information and communication technologies (ICT) are an essential component of modern life and cannot be ignored. For this reason, they concluded that teachers' knowledge of technological literacy and the applications of advanced tools is crucial, as these resources can be incorporated into lesson plans to train the future generation in advance level. In summary, while there is evidence of technological proficiency among secondary level students, the degree of proficiency varies significantly. Factors such as demographics and educational context play a role in shaping students' digital literacy. Furthermore, the ability to apply technological skills effectively in an educational context, especially during remote learning scenarios, remains a challenge for some student populations. It is clear that continued efforts to enhance digital literacy are necessary to ensure that all students are equipped with the technological skills required for the 21st century (Jan, 2018; Arsari, 2022; Sundus & Aziz, 2022; Baxter & Reeves, 2022; Özeren, 2023; Putra & Rullyanti, 2023).

Conclusions

The aforementioned study led to the conclusion that technology is the foundation of the modern world and that it is a crucial component of the professional lives of teachers, given their level of professional literacy. Based on the findings, the instructors were aware with the necessary technological skills to use information and communication tools for the teaching and learning process. The 21st century teachers have the knowledge of technology and were fully aware of the use of technology in the classroom. They also assisted students in becoming familiar with ICT, integrated classroom-related applications, and encouraged teachers to incorporate ICT tools into their lessons in order to enhance students' learning. The perception of secondary school teachers regarding their technological proficiency indicate that they are proficient in operating and utilizing technology in the classroom. Therefore it was concluded that there was an association between the technological awareness of teachers and the classroom practices of students and the null hypothesis were rejected.

Recommendations

On the basis of the results and findings it is suggested that the government take substantial measures to enhance the technological proficiency skills of 21st century teachers by providing regular training sessions to improve student performance in the classroom. Furthermore, experimental and mix method research studies should be conducted focusing the area of technology and its effect on the classroom performance of students for more accuracy to highlight the effectiveness and application of advanced technological tools during teaching and learning process.

References

Ahmad, W., Minaz, M. H., Shah, R., Baig, N, G., & Rashid, A. (2021). An Analysis of the Effectiveness of Blended Learning on Pedagogical Skills of Elementary School Teachers of Khyber Pakhtunkhwa. *Multicultural Education*, *7*(11).

Ali, A., Minaz, M., & Irshadullah, H. M. (2023). Teacher Support During Nano Learning Fascinate the Learning Experiences of Undergraduate Students: A Comparative Analysis. *International Journal of Social Science Archives (IJSSA)*, *6*(3).

Allen, P. M. (2001). A complex systems approach to learning in adaptive networks. *International Journal of Innovation Management*, *5*(02), 149-180.

Arsari, M. H. A. A. (2022). The importance of digital literacy to enhance students' ability in english language. *Jambura Journal of English Teaching and Literature*, *3*(1), 12-18.

Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale, and perceived student learning in technology-using classrooms?. *Computers & education*, *39*(4), 395-414.

Becker, M. C. (2001). Managing dispersed knowledge: organizational problems, managerial strategies, and their effectiveness. *Journal of management studies*, *38*(7), 1037-1051.

Costley, K. C. (2014). The positive effects of technology on teaching and student learning. *Online submission*.

Dror, I. E. (2008). Technology enhanced learning: The good, the bad, and the ugly. *Pragmatics & Cognition*, *16*(2), 215-223.

Gut, D. M. (2010). Integrating 21st century skills into the curriculum. In *Bringing schools into the 21st century* (pp. 137-157). Dordrecht: Springer Netherlands.

Habib, M., Ullah, H., & Minaz, M. (2023).Relationship between Teacher's Professional Literacy and Students 'classroom Performance at Secondary School Level. *Harf-o-Sukhan*, *7*(3), 335-348.

Jewitt, C. (2012). *Technology, literacy, learning: A multimodal approach*. Routledge.

Karehka, R. (2012). Technology And Society: Impact Of Technology On Society. *Retrieved Nov*, *8*, 2016.

Minaz, M., Tabassum, R., & Ahmad, A. (2018). Gender wise comparison of flipped classroom strategy on the performance of prospective teachers. *Advances in Social Sciences Research Journal*, *5*(3), 578-588.

Minaz, M., Tabassum, R., & Idris, M. (2017). An Experimental study of the performance of prospective teachers of flipped classroom and non-flipped classroom. *PJE*, *34*(2).

Norris, A. R. (2012). Computer-mediated communication and globalization: Considering social, academic, and business factors. *Inquiries Journal*, *4*(02).

Okojie, M. C., Olinzock, A. A., & Okojie-Boulder, T. C. (2006). The pedagogy of technology integration. *Journal of technology studies*, *32*(2), 66-71.

Özeren, E. (2023). Predicting Secondary School Students' 21st-Century Skills through Their Digital Literacy and Problem-Solving Skills. International Education Studies, 16(2), 61-75.

Putra, D. A., & Rullyanti, M. (2023).The Importance of Digital Literacy in Improving Students' Skills in English. *Journal Of Dehasen Educational Review*, *4*(3), 201-206.

Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, *3*(1), 33-35.

Reeves, M. (2022). Knowledge Management Use in Technology Operations for Innovations and Value Creation: Qualitative Case Study (Doctoral dissertation, University of Phoenix).

Roblyer, M. D., & Knezek, G. A. (2003). New millennium research for educational technology: A call for a national research agenda. *Journal of research on Technology in Education*, *36*(1), 60-71.

Rockman, H. B. (2004). *Intellectual property law for engineers and scientists*. John Wiley & Sons.

Ryan, A. B. (2006). Post-positivist approaches to research. *Researching and Writing your Thesis: a guide for postgraduate students*, 12-26.

Siddiq, F., Gochyyev, P., & Wilson, M. (2017). Learning in Digital Networks–ICT literacy: A novel assessment of students' 21st century skills. Computers & Education, 109, 11-37..

Strudler, N., & Wetzel, K. (2011). Electronic portfolios in teacher education: Forging a middle ground. *Journal of Research on Technology in Education*, *44*(2), 161-173.

Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2017). The relation between 21st-century skills and digital skills: A systematic literature review. *Computers in human behavior*, *72*, 577-588.