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Fostering Students for 21st Century Skills by Using Technology

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Abstract

The present study explores the role of technology in fostering critical skills such as collaboration, communication, creativity, problem-solving, digital literacy, and adaptability among students. Emphasizing the need for a paradigm shift, the paper highlights how digital tools and platforms can create interactive, personalized, and engaging learning environments. By leveraging technologies like Artificial Intelligence (AI), Learning Management Systems (LMS), virtual reality (VR), and gamified learning, educators can enhance students' critical thinking and prepare them for the demands of a knowledge-driven global economy. Moreover, the study underscores the importance of aligning technological interventions with pedagogical goals to ensure meaningful skill acquisition. Key challenges, including the digital divide, lack of teacher training, and resistance to change, are discussed, alongside strategies to overcome them. The paper advocates for a blended learning approach, integrating traditional teaching methods with technology-driven instruction, to ensure inclusive and equitable access to 21st-century skills. This research concludes by emphasizing the pivotal role of policymakers, educators, and institutions in equipping students with the competencies required to thrive in a dynamic and interconnected world. By harnessing technology effectively, education systems can transform students into innovative thinkers, ethical digital citizens, and lifelong learners, capable of contributing meaningfully to society.

Keywords: *21st-Century Skills, Educational Technology, Blended Learning, Digital Literacy, Pedagogical Integration.*

1. INTRODUCTION

The word "education" comes from the Latin words educare (to bring up or to nourish) and educere (to bring forth or to draw out). The word educare was adopted by Shakespeare in the 1500s which means "schooling". Education is a broad term that is directly related to the acquisition of knowledge, experience, and teaching learning process. It is the process of acquiring knowledge, skills, habits, methods, and beliefs that enable an individual not only to develop himself, but also to develop society and the whole nation. Education is

the weapon that distinguishes right from wrong which helps to prepare an individual for a better life in the present era. Education develops a person's physical, mental, and spiritual powers, it means overall development of an individual. In one sentence, we can define "Education" as, just a hammer and sugar are used to carve a piece of marble, so in the same way, education can be used to reveal a person's personality and hidden talents.

> ***According to Mahatma Gandhi****: "By Education I mean an all-round drawing out of the best in man- body, mind and spirit."*
>
> ***According to Herbert Spencer****: "Education is complete living."*
>
> ***According to John Dewey****: "Education is the process of living through a continuous reconstruction of experience."*
>
> ***According to Gilbert K. Chesterton****: "Education is simply the soul of a society as it passes from one generation to another."*

Always remember this thing

- If you are planning for One year, grow Rice.
- If you are planning for Ten years, grow Trees.
- If you are planning for Hundred years, Educate your children.

21st Century Skills are these skills that will enable students to succeed in their lives in the future. 21st Century Skills emerged in 2006 as part of the Organizational for Economic Co-operation and Development which focus on 21st Century Skills and how to ensure that students can acquire them easily. It is a combination of a wide variety of skills and information like collaboration, digital literacy, critical thinking, problem solving, communication skills, creativity, adaptability, interpersonal skills, cultural literacy, social skills, innovation skills, flexibility, career skills, higher order thinking, meta-learning, citizenship, productivity, decision making, leadership and growth mindset etc. which is extremely important for development and success in the present era. It teaches us to live accordingly to the current scenario.

In the early 1980s, government academics issued a series of reports identifying a variety of key skills to meet the changing demands of society, beginning with the 21st Century Skills developed by USNRC.

> ***According to Ismail****: "21st Century Skills refer to managerial skills that are necessary for the present."*

The 21st century is the era of science and technology which has left a deep and positive impact on education, impacting every sphere of an individuals' life. In today's era of technology, it is very important for an individual to achieve these 21st Century Skills through education to live a better life in the present era. In the field of education, familiarizing students with different types of technology can simplify the process of their single task and create a variety of skills and competencies in it. The purpose of education is to enable the student to become a good citizen and responsible human being who can better recognize the hidden talents and abilities within him / her, just preparing students for the exam does not help them to face the situations of life. So, in the present times, 21st century skills play a vital and an important role in empowering children and youth to deal with the problems related to their life. Since the teacher can inject the 21st century skills into the students through education. Through 21st century skills like critical thinking, creativity, Perseverance, Information literacy, Cultural literacy, Technology skills and digital literacy, Media literacy, Global awareness, Self-direction, social responsibility, thinking skills, Flexibility, Initiative, Productivity, Leadership, Knowledge, and character students can improve their daily life as well as academic life. These skills connect students to work. It enables them to do their job better and more efficiently. make them successful in life. Prepares them for their careers as well as prepares them for the challenges and opportunities of the 21st century Therefore, we cannot deny the importance of 21st century skills and ignore its importance in today's time - therefore, it becomes very important for the teacher to introduce 21st century skills to the students through education so that the students can succeed in their daily life as well as in their academic life.

2. REVIEW OF RELATED LITERATURE

Coskun (2024) conducted a study on "Unlocking the Future: The Role of Digital Learning Materials in Fostering 21st-Century Skills Among University Students". The purpose of the study was to evaluate the effect of the digital learning material development process on

university students' 21st-century competencies. A sequential exploratory design (both quantitative and qualitative) was used as a methodology. The findings showed that one group reported the development of 21st-century competencies in 12 themes with low achievement scored while the other group scored high achievement in 15 themes.

(Mushtaq M. &., 2024). This study explores hybrid pedagogies and online learning approaches focusing on blended and flipped learning in digital environments. Blended learning combines online tools with classroom instruction, while flipped learning fosters collaboration and critical thinking. Both enhance engagement, academic performance, and digital skills. Success relies on robust technology, educator training, and innovative strategies for modern education

Dhakal (2023) examined research on "Pedagogical Use of 21st century Skills in Nepal". The purpose of this study was to know the effectiveness of 21st Century Skills towards the integration of Teaching Learning practices. Both qualitative and quantitative methodology (online survey questionnaire and semi-structured interview) were used. The findings revealed that moderate using of 21st Century Skills in pedagogical activities were found.

(Mushtaq B. l., 2023) A study on engagement in blended learning and academic performance among 400 secondary students used a descriptive survey method and a self-developed questionnaire. Statistical techniques like frequency, mean, correlation, and t-tests analyzed the data. The study highlights the need for continuous innovation and collaboration in teaching to support students' evolving academic needs and future success.

Pramasdyahsari, et al. (2023) examined a study on " Fostering students 'mathematical critical thinking skills on number patterns through digital book STEM PjBL". The aim of the study was to develop a digital book STEM PjBL to foster students' mathematical critical thinking skills. Experimental research using one group pre-test and post-test design was used. The findings revealed that the digital book STEM PjBL was valid and significant in fostering students' critical thinking skills and had a positive impact on other 21st century learning skills.

Rahman, Zhang, Mahmood et al. (2023) conducted research on "Fostering twenty-first century skills among primary school students through math project-based learning". The aim of the research was to identify whether project-based learning improved students' twenty-first century skills or not. A quasi-experimental design (non-equivalent control group pre-test-post-test design) was used as a methodology. The findings showed that by using project-based learning, students' active participation and effective collaboration were observed and a significant contribution was found too.

Fung, and Ng (2022) conducted a study on "Fostering student teachers' 21st century skills by using flipped learning by teaching in STEM education". The purpose of the study was to investigate how Flipped Learning could foster students' 21st Century Skills. Triangulation of data, observation and focus groups were used as an assessment tool for this study. The findings suggested that by using Flipped learning, it could foster students' 21st Century Skills.

Ogegbo and Aina (2022) conducted a study on "Fostering the Development of 21st Century Competencies Through Technology in Young Children: Perceptions of Early Childhood Educators". The purpose of this study was to explore early childhood educators' perceptions of technology in facilitating the development of 21st Century Competencies in young children in South Africa. The researcher used qualitative (observation, field notes and semi-structured interviews) and Exploratory case study design as a research methodology. The findings demonstrated that the use of these technology tools assisted educators in fostering 21st-century competencies.

Abdullateef (2021) conducted a study on "Remote Learning: Fostering Learning of 21st Century Skills through Digital Learning Tools". The purpose of this research was to find out the impact of four digital tools (Discussion Forums, Kahoot, Padlet, and FlipGrid) in fostering 21st Century Skills. The study used a quantitative approach in which open-ended questionnaire was used. The results revealed that the four digital tools empowered learners and fostering 21st Century Skills too.

Choudary and Khushnood (2021) conducted a study " Comparative study of 21st Century Skills of Science Teachers and Students of Formal and Non-Formal Educational Institutes". The aim of the study was to probe the skills of science teachers regarding 21st Century Skills. An

online survey consists of questionnaire and 5-Point Likert Scale. The findings showed that Science Students possess more 21st Century Skills than their teachers.

Francisco, et al. (2021) examined research on "Fostering 21st Century Competences through Computational Thinking and Active Learning: A Mixed Method Study". The aim of this study was to develop a Computational Thinking Curriculum based on learner-centred pedagogical strategies to enhance 21st Century Skills. A mixed-method approach (both quantitative and qualitative) was used by the researcher. The findings showed that by developing the curriculum, it was found that the students and the teacher were able to form a community to facilitate teaching learning process and also increased students' skills.

Jamali, K., (2021) conducted a study on " Fostering 21st Century Skills Using an Online Discussion Forum in an English for Specific Purpose Course". The purpose of this study was to explore English for Specific Purpose Students' utilisation of an online discussion forum towards university Learning Management System for making a Company Profile as well as fostering 21st Century Skills. A case study (interview) was used. The results showed that online discussion forum gave a inclusive venue for developing critical thinking, leadership, discipline, time management and digital skills.

Lavi, and Dori (2021) conducted a study on "Perceptions of STEM alumni and students on developing 21st century skills through methods of teaching and learning". The purpose of this research was to evaluate the development of students' 21st century skills at a STEM research university. A self-reporting questionnaire was used by the researcher. The findings revealed that domain-general skills scored higher than STEM-specific skills and the STEM-specific skills scored higher than soft skills.

Rayna and Striukova (2021) conducted a study on "Fostering skills for the 21st Century: The role of Fab labs and makerspaces". The aim of the study was to investigate the role of Fabrication spaces towards fostering 21st Century Skills. The researcher used two combined qualitative research methodology (semi-structure interviews and focus group). The results revealed that only explicit and proactive entrepreneurship and education programme enable to foster spectrum of these skills.

Sanchez (2021) examined a study on "Integrating Technology to Foster the Development of Students with 21st Century Skills". The aim of the study was to gain a deeper understanding about technology integration to develop students' higher order thinking skills. A survey (Question based on Likert, Multiple response and Open-ended) method was used by the researcher. The results offered practical strategies to successful technology integration student-centered model.

Alkhayari (2020) conducted a study on "Fostering 21st Century Learning Skills in English as a Second Language Classrooms". The purpose of this study was to inspect ELS learners' preferred skill among 21st century skills and how to extent ESL teachers integrated these skills into their practices. The mixed-method (both quantitative and qualitative, survey and semi-structure interview) used by the researcher. The results showed that more communicative tasks could be blended into ESL classrooms which helped to improve their 21st Century Skills.

Liesa et al. (2020) conducted a study on " The Technological Challenge Facing Higher Education Professors: Perceptiins of ICT Tools for Developing 21st Century Skills". The objective of this research was to analyze how university professors consider that ICTs could contribute to developing skills and abilities in their students. The researcher used a quantitative study with a descriptive survey and non-experimental design (Questionnaire). The findings revealed that the professors identify the potential of the ICTs and considered a positive effect on the development of 21st century skills in their students.

Nguyen, and Mai (2020) conducted a study on" Facilitating Cultural Exchange and Fostering 21st Century Skills Using Skype in the Classroom." The purpose of this study was to determine the effectiveness of Skype for the improvement of 21st century skills among Vietnamese university students. A 5-point Likert scale questionnaire and semi-structured interviews were used by the researcher. The finding showed that the activities had a positive effect on the development of 21st century skills and fostering students' critical thinking and communication skills.

Uche and Eze (2020) conducted research on "Fostering 21st Century Learning Skills: Teacher Educators' and Pre-service Science Teachers' Perceptions". The objective of the research was to investigate that does the classroom activities in teacher education incorporate pedagogical practices which foster the development of 21st Century Learning Skills. The researcher used a descriptive survey design as a methodology. The findings revealed that the teacher educators reported that classroom practices fostering students critical thinking, creativity as well as innovation skills.

Mekala and Harishree (2020) conducted a study on "Fostering 21st Century Skills of the Students of Engineering and Technology". The purpose of this study was to investigate the capability of the students of engineering with respect to Innovation Skills, Life and Career Skills of 21st Century Skills. The researcher used an online survey (self-rating questionnaire) as a research methodology. The findings recommended that for enhancing the 21st Century Skills in the students, it is very important to integrate the 21st Century Skills in student's classroom of engineering and technology to meet the demand.

Albahlal (2019) conducted a study on " The Integration of 21st Century Skills into English Language Learning". The aim of the study was to probe that how 21st Century Skills was integrated or incorporated into English language learning. The researcher used the descriptive approach for this study. The results showed that 21st century skills were highly essential for the educational system, it's played a major role for EFL students and gave the step-by-step strategies for the integration of 21st century skills into English language learning.

Bani-Hamid and Abdullah (2019) conducted a study on "The Effect of Project-Based Learning to improve the 21st Century Skills among Emirati Secondary Students". The objective of this research was to find out the effect of project-based learning on the improvement of 21st Century Skills among Emirati Secondary Level Students. An Experimental design was used by the researcher. The findings revealed that the project-based learning approach had a significant effect on improvement of 21st Century Skills among Students.

Cretu (2017) conducted a study on "Fostering 21st century skills for future teachers". The objective of this research was to demonstrate the ways in which the four skills were integrated during a Theory and Methodology of Instruction course for pre-primary and primary school teachers. The researcher used questionnaire (Closed and Open-ended and 5-point Likert type scale). The findings showed positive results for integrating the four skills towards Theory and Methodology of Instruction course for pre-primary and primary school teachers.

Husin, et al. (2016) conducted research on " Fostering students' 21st Century Skills through Project Oriented Problem Based Learning (POPBL) in integrated STEM education program ". The aim of this research was to investigate the changes of 21st Century Skills among students after participating in an integrated STEM education program. One group quasi-experimental method was used in this research. The results revealed that the level of 21st Century Skills were increased and it enhanced their problem-solving skills in real life experiences.

Soh, O,. and Arsad (2012) conducted a study on "M-21CSI: A Validated 21st Century Skills Instrument for Secondary Science Students". The aim of this study was to talk about the development process of the Malaysian 21st Century Skills Instrument in the teaching learning process of science. The researcher used cross sectional survey method and focus group as a research methodology. The results showed that it is a useful instrument to evaluate the mastery of Malaysian Students towards 21st Century Skills.

Sukor, and Abdullah (2010) examined a study on "Students' achievement of Malaysian, 21st Century Skills in chemistry". The purpose of this study was to identify the achievement of the Malaysian 21st Century Chemistry Skills Test among Secondary School Students in Malaysia. The survey method (Multiple choice items) was used by the researcher. The findings revealed that the overall students' mean score in CCST (21st Century Chemistry Skills Test) is low and high socioeconomic status scored higher compared to low socioeconomic status.

Thomas and Greene (2011) conducted research on "Fostering 21st Century Skill Development by Engaging Students in Authentic Game Design Projects in a High School Computer Programming Class". The purpose of this study was to evaluate the use of game development in a high school computer programming class for the

development of 21st century skills. The researcher used ethnography as the overarching design (Observation, Interview and focus group). The results showed that such approaches like video games, design, programming, authenticity and cooperation mobilize multiple 21st century skills that nurtured among students to become a productive citizenry.

3. SIGNIFICANCE OF THE STUDY

This study is significant as it addresses the urgent need to equip students with 21st-century skills essential for thriving in a knowledge-driven, technology-intensive global economy. In an era marked by rapid technological advancements and dynamic societal demands, the role of education in fostering critical skills such as collaboration, communication, creativity, problem-solving, digital literacy, and adaptability has become paramount. By integrating technology into pedagogical practices, this study highlights how interactive and personalized learning environments can enhance critical thinking and innovative capabilities among students.

The research further sheds light on the challenges of implementing technology in education, such as the digital divide, lack of teacher training, and resistance to change, providing actionable strategies to address these barriers. It emphasizes the need for aligning technological interventions with pedagogical goals to ensure meaningful and inclusive learning experiences.

This study also contributes to the broader discourse on educational reform by advocating for blended learning approaches, which balance traditional teaching methods with technology-driven instruction. By exploring the transformative potential of technology in fostering ethical digital citizens and lifelong learners, this research offers valuable insights for policymakers, educators, and institutions aiming to bridge the gap between current educational practices and future workforce demands.

4. OBJECTIVE

- To explore the role of technology in fostering 21st-century skills among students in diverse educational settings.

5. RESEARCH QUESTION

- How can the integration of technology effectively enhance the acquisition of 21st-century skills among students?

6. METHODOLOGY

This study adopts a qualitative research approach, relying on secondary data sources to examine the role of technology in fostering 21st-century skills among students. A comprehensive review of existing literature, including scholarly articles, reports, case studies, and policy documents, was conducted to analyze the impact of technological tools and platforms on skills such as critical thinking, communication, collaboration, and digital literacy. Databases such as Scopus, Web of Science, and Google Scholar were utilized to collect relevant data. The study focuses on synthesizing insights from diverse educational contexts to understand how technologies like Artificial Intelligence (AI), Learning Management Systems (LMS), virtual reality (VR), and gamified learning environments have been implemented and their effectiveness in skill development. Emphasis is placed on identifying best practices and challenges associated with integrating technology into teaching and learning processes. Secondary data analysis also explores global and regional disparities in access to technology, shedding light on the digital divide and its implications for equitable education. By triangulating findings from various sources, this methodology aims to provide a nuanced understanding of how technology can be strategically aligned with pedagogical goals to enhance students' readiness for the demands of the 21st century.

7. REVIEW BASED DISCUSSION

The fostering of 21st-century skills through technology and innovative teaching methods has garnered significant attention in educational research, as evident in the studies reviewed. These studies collectively underscore the importance of integrating 21st-century skills—critical thinking, communication, collaboration, and digital literacy—into diverse educational contexts using various methodologies and technological tools.

Mekala and Harishree (2020) emphasize the integration of innovation and career skills in engineering classrooms, suggesting the necessity of aligning curricula with 21st-century demands.

Similarly, **Sanchez (2021)** provides practical strategies for technology integration using a student-centered model, highlighting how such approaches enhance higher-order thinking skills. These findings resonate with **Fung, Poon, and Ng (2022)**, who demonstrate the effectiveness of flipped learning in STEM education to foster critical 21st-century skills, reinforcing the potential of alternative pedagogies in enhancing these competencies.

The role of digital tools in fostering 21st-century skills is explored by **Abdullateef (2021) and Rayna and Striukova (2021)**. The former illustrates the empowering effect of tools like Kahoot and FlipGrid on learners, while the latter highlights the role of Fab labs and makerspaces in cultivating entrepreneurship and practical skills. Both studies advocate for explicit and proactive integration of technology to maximize its educational benefits.

Several studies examine the effectiveness of project-based learning (PBL) in fostering these skills. **Husin et al. (2016) and Bani-Hamid and Abdullah (2019)** report the significant impact of PBL on students' problem-solving and collaboration skills in STEM and secondary education, respectively. Similarly, **Rahman et al. (2023)** confirm the effectiveness of math-based PBL in enhancing active participation and teamwork among primary school students. These findings collectively suggest that PBL provides a structured framework for students to apply and refine their 21st-century skills in real-world scenarios.

Cultural and contextual nuances also emerge as pivotal in fostering these competencies. **Uche and Eze (2020)** explore the perceptions of teacher educators and pre-service teachers, emphasizing the importance of integrating critical thinking and creativity into teacher education. **Alkhayari (2020) and Albahlal (2019)** highlight the integration of communicative tasks and strategic skill development in ESL classrooms, showing how linguistic contexts shape the implementation of 21st-century skills.

Quantitative and mixed-method approaches dominate the reviewed studies, showcasing the utility of instruments like surveys, focus groups, and experimental designs. For instance, **Soh et al. (2012) and Sukor et al. (2010)** use validated instruments to measure the acquisition of these skills, while **Nguyen et al. (2020) and Francisco et al. (2021)** employ mixed methodologies to provide deeper insights into technological and pedagogical strategies. The diversity in methodologies enriches the understanding of fostering 21st-century skills across disciplines and educational levels.

Notably, disparities in access to technology and resources are addressed in studies like **Dhakal (2023) and Coskun (2024)**. These studies reveal moderate to low achievements in skill development among certain groups, emphasizing the need to bridge the digital divide and ensure equitable opportunities for skill acquisition.

In conclusion, the reviewed studies collectively highlight the transformative potential of integrating technology, innovative pedagogies, and culturally responsive strategies to foster 21st-century skills. They underscore the importance of contextual adaptability, proactive teacher training, and the strategic use of digital tools in creating inclusive and effective learning environments. While progress has been made, further research is needed to address disparities and refine methodologies for fostering these essential skills in diverse educational settings.

8. CONCLUSION

This study highlights the significant role of technology in fostering 21st-century skills, such as critical thinking, communication, collaboration, and digital literacy, across diverse educational contexts. Through a comprehensive review of secondary data, it is evident that integrating innovative pedagogies and technological tools can significantly enhance students' readiness for the demands of the modern world. Technologies like Artificial Intelligence (AI), Learning Management Systems (LMS), virtual reality (VR), and gamified learning environments have shown immense potential in bridging the gap between traditional teaching methods and the evolving needs of the 21st century.

The reviewed studies underscore the effectiveness of student-centered approaches like project-based learning (PBL) and flipped classrooms, which allow students to actively engage with real-world problems and develop critical competencies. Tools like Kahoot, FlipGrid, Fab labs, and makerspaces further illustrate how technology can empower students, fostering creativity, entrepreneurship, and practical skills.

However, these findings also emphasize the importance of proactive and strategic integration of these tools to maximize their educational benefits.

Cultural and contextual factors emerged as key considerations in the implementation of 21st-century skill development. For instance, linguistic and regional nuances shape the effectiveness of pedagogical strategies, underscoring the need for culturally responsive approaches. Similarly, the digital divide remains a critical challenge, as disparities in access to technology and resources hinder equitable opportunities for skill acquisition.

To fully harness the transformative potential of technology in education, ongoing efforts must focus on addressing these disparities, enhancing teacher training, and fostering adaptability in pedagogical approaches. Further research is required to refine methodologies, explore emerging technologies, and evaluate their long-term impact on skill development. By aligning technological advancements with pedagogical goals, education systems can create inclusive and effective learning environments that prepare students for the challenges and opportunities of the 21st century.

REFERENCES

Albahlal, F. S. (2019). The Integration of 21th Century Skills into English Language â€ ŽLearning. Journal of Applied Linguistics and Language Research, 6(3), 144-154.

Alkhayari, H. (2021). Fostering 21st century learning skills in English as a Second Language classrooms.

Bani-Hamad, A. M. H., & Abdullah, A. H. (2019). The Effect of Project-Based Learning to Improve the 21st Century Skills among Emirati Secondary Students. International Journal of Academic Research in Business and Social Sciences, 9(12), 560–573.

Buitrago-Flórez, F., Danies, G., Restrepo, S., & Hernández, C. (2021). Fostering 21st Century Competences through Computational Thinking and Active Learning: A Mixed Method Study. International Journal of Instruction, 14(3), 737-754.

Choudhary, F. R. ., Ahmed, S. Z. ., Sultan, S. ., & Khushnood, S. (2021). Comparative study of 21st Century Skills of Science Teachers and Students of Formal and Non-Formal Educational Institutes. Review of Education, Administration & Law, 4(1), 231-241. https://doi.org/10.47067/real.v4i1.131

Coşkun, T. K. (2024). Unlocking the Future: The Role of Digital Learning Materials in Fostering 21st-Century Skills Among University Students. In Augmented Reality and the Future of Education Technology (pp. 229-252). IGI Global.

Cretu, D. (2017). Fostering 21st century skills for future teachers. European Proceedings of Social and Behavioural Sciences.

Dhakal, B. P. (2023). Pedagogical Use of 21st Century Skills in Nepal. Chintan-Dhara, 1-13.

Fung, C. H., Poon, K. K., & Ng, S. P. (2022). Fostering student teachers' 21st century skills by using flipped learning by teaching in STEM education. Eurasia Journal of Mathematics, Science and Technology Education, 18(12).

Hah Abdullateef, S. (2021). Remote learning: Fostering learning of 21st century skills through digital learning tools. Arab World English Journal (AWEJ) Special Issue on CALL, (7).

Jamali, M., & Krish, P. (2021). Fostering 21st Century Skills Using an Online Discussion Forum in an English for Specific Purpose Course. Malaysian Journal of Learning and Instruction, 18(1), 219-240.

Kalu-Uche, N., & Eze, G. N. (2020). fostering 21st century learning skills: teacher educators 'and pre-service science teachers 'perceptions. Journal of The Nigerian Academy of Education, 15(2).

Lavi, R., Tal, M., & Dori, Y. J. (2021). Perceptions of STEM alumni and students on developing 21st century skills through methods of teaching and learning. Studies in Educational Evaluation, 70, 101002.

Liesa-Orús, M., Latorre-Cosculluela, C., Vázquez-Toledo, S., & Sierra-Sánchez, V. (2020). The technological challenge facing higher education professors: Perceptions of ICT tools for developing 21st century skills. Sustainability, 12(13), 5339.

Mekala, S., & Harishree, C. (2020). Fostering 21st Century Skills of the Students of Engineering and Technology. Journal of Engineering Education Transformations, 34(2).

Mushtaq, M. &. (2024). Hybrid Pedagogies: Acessing the Effectiveness of Blended and Flipped Learning in Digital learning Environment. International Journal of Emerging Knowledge Studies, 3(9), 662-669. doi:https://doi.org/10.70333/ijeks-03-09-034

Mushtaq, M. a. (2023). Engagement in Blended learning and academic performance of secondary level students. 14(2), 129-137. doi: 10.30954/2230-7311.2.2023.8

Nguyen, N. D., Liwan, V. B., & Mai, T. T. (2020). Facilitating cultural exchange and fostering 21st century skills using Skype in the classroom. Computer-Assisted Language Learning Electronic Journal, 21(3), 88-104.

Ogegbo, A. A., & Aina, A. Y. (2022). Fostering the Development of 21st Century Competencies Through Technology in Young Children: Perceptions of Early Childhood Educators. Education and New Developments, 10.

Pramasdyahsari, A. S., Setyawati, R. D., Aini, S. N., Nusuki, U., Arum, J. P., Astutik, I. D., & Salmah, U. (2023). Fostering students' mathematical critical thinking skills on number patterns through digital book STEM PjBL. Eurasia Journal of Mathematics, Science and Technology Education, 19(7), em2297.

Rayna, T., & Striukova, L. (2021). Fostering skills for the 21st century: The role of Fab labs and makerspaces. Technological Forecasting and Social Change, 164, 120391.

Rehman, N., Zhang, W., Mahmood, A. et al. (2023). Fostering twenty-first century skills among primary school students through math project-based learning. Humanit Soc Sci Commun 10, https://doi.org/10.1057/s41599-023-01914-5

Sanchez, C. (2021). Integrating Technology to Foster the Development of Students with 21st Century Skills. San Diego State University.

Soh, T. M. T., Osman, K., & Arsad, N. M. (2012). M-21CSI: A validated 21st century skills instrument for secondary science students. Asian Social Science, 8(16), 38.

Sukor, N. S., Osman, K., & Abdullah, M. (2010). Students' achievement of Malaysian 21st century skills in chemistry. Procedia-Social and Behavioral Sciences, 9, 1256-1260.

Thomas, M. K., Ge, X., & Greene, B. A. (2011). Fostering 21st century skill development by engaging students in authentic game design projects in a high school computer programming class. Journal of Educational Computing Research, 44(4), 391-408.

Wan Husin, W. N. F., Mohamad Arsad, N., Othman, O., Halim, L., Rasul, M. S., Osman, K., & Iksan, Z. (2016, June). Fostering students' 21st century skills through Project Oriented Problem Based Learning (POPBL) in integrated STEM education program. In Asia-Pacific Forum on Science Learning & Teaching 17(1).

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