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Public School Digital Culture and Teachers' Competence in El Salvador City Division

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ABSTRACT: Digital culture and teachers' competence is crucial when linked, raising concerns about the effectiveness of digital integration in education. This study was conducted to determine the level of school digital culture and teachers' digital competence within the Division of El Salvador City for School Year 2024-2025. Specifically, this aimed to describe the respondents' profile, find the level of school digital culture and teachers' competence; determine significant relationship between teachers' perception on school digital culture and their digital competence; and test the significant difference in teachers' digital competence when grouped according to their profile. Using complete enumeration method, the study involved 423 teachers from 23 schools within the division. The study employed descriptive correlational research design and data were collected using researcher-made; adapted and modified questionnaire. The data were evaluated with descriptive statistics, Pearson Correlation Coefficient (r) and T-tests. The findings revealed that school policies and guidelines was the highest aspect of school digital culture while pedagogical knowledge was identified as the highest in terms of teachers' digital competence. Significant relationships were found between school digital culture and teachers' digital competence. Teaching experience and highest educational attainment were significant factors influencing digital competence while age and school category did not significantly impact digital competence. Overall, school digital culture was significantly related to teachers' competence which explained that if the school's digital culture was high, teachers' competence was also high. Moreover, there was still a need for continued investment in technological infrastructure and more targeted professional development programs to address gaps in creativity and problem-solving skills.

KEYWORDS: school digital culture, teachers' digital competence

I. INTRODUCTION

School digital culture refers to the integration of digital tools and technologies into the educational environment. It is shaping how teaching, learning, collaboration, and innovation take place. It emphasizes the widespread use of digital technologies in educational settings. Also, it creates a culture that supports not only the development of technological skills but also the collaborative and innovative use of digital resources to enhance the learning experience. As schools evolve into digital spaces, the digital culture becomes a critical element in producing students who are adept at using technology, collaborating digitally, and engaging with the world through a variety of technological means (Engen, 2019).

In the context of teaching, digital competence refers to teachers' ability to use digital tools effectively in their instruction, fostering an environment where students can learn through innovative digital practices. This competency includes the capacity to use digital technology critically, confidently, and ethically in order to improve teaching strategies and support students' digital learning experiences. Teachers in today's educational environment must not only use digital tools, but also modify them to achieve particular pedagogical objectives. This guarantees that they can instruct kids who were born into a world where digital technologies are ubiquitous.

However, the current education system and the majority of teachers still predominantly rely on traditional teaching methods that may not fully address the needs of today's digitally native students. The rapid evolution of digital tools presents both challenges and opportunities. This requires educators to adapt their teaching practices to incorporate these tools in ways that are relevant and effective for modern learners. Teachers must embrace continuous professional development to enhance their digital competencies, ensuring they can engage with students in a digital-first world. This development goes beyond merely using digital tools. This involves integrating technology into teaching with a clear pedagogical purpose, creating a more interactive and engaging classroom that aligns with the needs of 21st-century learners (Mensan & Anagun, 2022).

Furthermore, the integration of digital tools requires a holistic approach to teacher's competence (Fernández-Batanero et al., 2020), where technological skills are combined with content knowledge, pedagogical strategies, and critical thinking. Teachers are not only expected to use technology but to evaluate and customize it to suit specific areas of learning, thus enhancing their students' educational experiences. This comprehensive view of teacher digital competence is essential for ensuring that educators are prepared to effectively use technology in the classroom. This fosters a culture of digital literacy and innovation that will benefit both teachers and students in an increasingly digital world (Skantz-Åberg et al., 2022).

The need for instructors with digital skills has increased as society grows more digitally savvy. Because of this change, educators must embrace the traits of both digital natives and digital immigrants in order to adjust to the digital environment. To effectively educate children who will lead and thrive in a constantly evolving digital environment, educators—regardless of their birthdates—must constantly upgrade their digital abilities. This hybrid teacher profile, which combines digital characteristics of native speakers and immigrants, calls for a dedication to lifelong learning and flexibility. These are necessary to get pupils ready for the opportunities and challenges of the twenty-first century. Therefore, contextualizing school digital culture involves creating a dynamic environment where both students and teachers are equipped with the skills, knowledge, and tools to engage with and contribute to the digital society.

Ghurbhurun (2020) highlighted that many educators face challenges with technology and often lack confidence in managing it effectively. Students believe that the best way for institutions to promote learning would be to assist teaching personnel in becoming more proficient with technology. Observations show that some teachers have chosen to be either untrained or trained in the use of technology. Additionally, some schools lack the necessary technology or have an underdeveloped digital culture to serve all of their students. As such, there is a need for every school to address the issue. It is on this premise that his study was conducted to find out the school digital culture and teachers' digital competence and to come up with solutions to this rising problem in education.

This study was anchored on Information Theory**,** a concept developed by Claude Shannon in 1948. This theory focused on how information is transmitted, processed, and understood, with an emphasis on reducing uncertainty in communication. At its core, Information Theory suggested that communication involved sending data through a channel, where interference or "noise" can distort the message. In this study, Information Theory is applied to understand how digital tools and technological knowledge are communicated and processed in the school environment.

By applying Information Theory, the study views the integration of technology in education as a communication process. Teachers, as recipients of digital information (such as training, resources, or guidance from school leadership), must decode and make use of this information to effectively implement technology in their teaching. Similarly, the clarity and quality of the information teachers received whether from formal training or informal collaboration, affected how well they can adopt and use new technologies. Just as Information Theory emphasized minimizing noise to ensure accurate data transmission, the study suggested that reducing barriers such as insufficient training or unclear instructions can improve teachers' ability to integrate technology successfully.

The relevance of Information Theory to this research lies in its ability to illuminate how teachers process the information they receive about digital tools. It highlighted how their individual characteristics such as age, gender, and educational background might affect and how they interpreted and applied this information. This understanding was crucial for developing strategies that ensured effective communication and support, helping teachers enhanced their digital competence. By framing the study through the lens of Information Theory, it emphasized the importance of clear and accessible communication in fostering technology adoption, ultimately improving the quality of teaching and learning in schools.

This paradigm highlighted the interconnected relationships between school digital culture, teachers' digital competence, and various personal characteristics of respondents, which collectively shaped the development of a School Management Plan. These elements work together to create a pathway for improving teachers' digital skills and ensuring effective integration of technology in education.

At the center of this framework is School Digital Culture**,** identified as the independent variable. This aspect reflected the foundation that schools must establish to promote the use of technology in teaching and learning. It included four crucial components. First, technological infrastructure is referred to the tools and systems that supported digital education, such as computers, software, and reliable internet. Schools with well-developed infrastructure provided teachers with the resources they needed to enhance their lessons and engage students effectively. Next, policies and guidelines served as a set of rules and protocols that ensured digital tools were used responsibly and effectively by both teachers and students. These policies set clear expectations and reduced the risks associated with misuse of technology. Support and training formed another essential part of the culture, emphasizing the need for professional development programs that helped teachers build confidence in using digital

tools. Finally, creativity and innovation focus on encouraging educators and students to explore new teaching methods, think critically, and solve problems using digital technologies, fostering a dynamic and forward-thinking learning environment.

On the other hand, the dependent variable is Teachers' Digital Competence**,** which represented the skills and knowledge teachers needed to effectively incorporate technology into their classrooms. This competence is divided into four key areas. Digital literacy refers to a teacher's ability to access, evaluate, and use digital tools in a meaningful way. Pedagogical knowledge highlighted how teachers applied technology in their teaching strategies to create engaging and effective learning experiences. Problem-solving involved the use of digital tools to overcome challenges and improve classroom interactions. Lastly, adaptation and transformation reflected a teacher's ability to evolve and adjust their teaching methods to align with the changing demands of the digital age, ensuring their practices remain effective and relevant.

The moderating variables focused on the unique characteristics of the respondents that may influence how school digital culture impacted teachers' digital competence. Age is a significant factor, as younger teachers who grew up in a digital world often adapted more easily to technology, while older teachers may require additional support and training. Teaching experience explored valuable insights into classroom management and instructional strategies, though more seasoned teachers may need time to adjust to new tools. A teacher's position within the school, whether they are a classroom teacher or in a leadership role, can affect their exposure to and use of digital resources. Similarly, highest educational attainment played a role, as teachers with advanced degrees often have greater exposure to digital tools during their studies. School category**,** such as primary or secondary education, determined the type and availability of technological resources. Finally, a teacher's perception towards digital culture shaped their willingness to embrace and utilize technology in the classroom. Teachers who viewed digital tools positively were more likely to integrate them into their practices effectively.

This framework emphasized that a strong school digital culture not only enhanced teachers' digital competence but also acknowledged the diversity among educators. Understanding these relationships allowed school leaders to create tailored strategies to address gaps, support teacher development, and ensure that technology integration is equitable and effective. The resulting School Management Plan served as a practical guide for implementing initiatives such as improving infrastructure, offering targeted training, establishing clear policies, and fostering an environment of innovation. By addressing the needs of teachers and leveraging their strengths, schools can better equip educators to meet the demands of modern learners and improve overall educational outcomes. This approach ultimately supported a sustainable and inclusive transition to a digitally enriched educational environment.

II. METHODOLOGY

This study utilized a descriptive correlational research design. This method was a research approach used to identify relationship between variables without necessarily implying causation. In this method, researchers observed and described how variables were naturally related in the real world. It involved collecting data on multiple variables of interest and analyzing the patterns of correlations between them. Descriptive research, as defined by Fulgence (2020), was a qualitative research method employed to characterize traits of functions and assess specific hypotheses. Fulgence further emphasized the need for precision and clarity when defining the research problem for this type of study.

To collect data for this study, questionnaires were employed. This approach aligned with the conclusive quantitative research technique, which aimed to test specific hypotheses and elucidate properties or functions, as Vieira et al. (2020) outlined. This approach was expected to yield an accurate and precise representation of the situation. The study involved collecting, organizing, and representation of the situation. The study involved collecting, organizing, and analyzing data to derive meaningful insights form the findings. The key variables examined included the attributes of teacher respondents, their research competence, and their level of research engagement.

Descriptive Statistics such as frequency, percentage, mean and standard deviation were employed to determine respondents' characteristics like age, position, highest educational attainment, school categorization, and perception towards digital culture. Pearson Product Moment Correlation (r) was used to determine the significant relationship between the respondents perceived school digital culture and their digital competence. T-test was utilized to test the significant difference in the teachers' digital competence when grouped according to their profile.

III. RESULTS AND DISCUSSION

This study explored the significant relationship between teachers' perceptions of school digital culture and their digital competence. By examining how teachers' views on the digital culture within their schools correlated with their actual digital skills and capabilities, the study aimed to uncover whether a positive or negative perception of the digital environment influenced their competence in digital practices. The results section analyzed the strength and direction of this relationship, providing insights into

how perceptions of digital culture may impact teachers' ability to effectively utilize digital tools and strategies in their teaching. Understanding this relationship was crucial for developing targeted interventions that aligned school digital culture with the enhancement of teachers' digital competence.

Table 1 shows the correlation coefficients (r-values) and p-values of the relationship between teachers' perceptions of school digital culture and their digital competence across four dimensions: literacy, pedagogical knowledge, problem-solving, and adaptation and transformation. The null hypothesis between teachers' perception on school digital culture and their digital competence was rejected. The analysis identified which relationships were statistically significant and which were not. The statement suggested that there was a significant relationship between teachers' perceptions of their school's digital culture and their own digital competence. The digital culture of the school improved, it could have a positive impact on teachers' digital skills. Conversely, if teachers enhanced their digital competence, it may contribute to fostering a stronger digital culture within the school. This correlation highlighted the interconnectedness between the environment in which teachers work and their ability to effectively use digital tools and strategies. By strengthening the digital culture of the school, teachers may feel more supported and encouraged to develop their digital skills, creating a mutually reinforcing cycle that benefitted both teachers and students.

A significant relationship was indicated by a p-value less than 0.05, meaning there was a less than 5% probability that the observed relationship was due to chance. In this table, several aspects of school digital culture, such as technological infrastructure, policies and guidelines, support and training, and creativity and innovation, showed significant correlations with various dimensions of teachers' digital competence. On the other hand, a not significant relationship was indicated by a p-value greater than 0.05. In this table, some aspects of the school digital culture did not show a significant correlation with certain dimensions of teachers' digital competence.

Table 1.

Result of the Test on Relationship between Teachers' Perceived School Digital Culture and their Digital Competence

		Teachers Digital Competence				
School Digital Culture		Literacy	Pedagogical Knowledge	Problem-Solving	Adaptation and Transformation	Overall
Technological	r-value	0.11	0.27	0.21	0.22	0.20
Infrastructure	p-value	0.02	0.07	0.06	0.01	0.04
		S	NS	NS	S	S
Policies and	r-value	0.18	0.14	0.20	0.21	0.18
Guidelines	p-value	0.01	0.01	0.01	0.02	0.01
		S	**S**	**S**	**S**	**S**
Support and	r-value	0.20	0.11	0.17	0.18	0.17
Training	p-value	0.01	0.02	0.02	0.01	0.01
		S	**S**	**S**	**S**	**S**
Creativity and	r-value	0.18	0.29	0.39	0.22	0.27
Innovation	p-value	0.02	0.07	0.07	0.03	0.04
		S	**NS**	**NS**	**S**	**S**
Overall	r-value	0.17	0.20	0.24	0.21	0.21
	p-value	0.01	0.04	0.04	0.02	0.03
		S	**S**	**S**	**S**	**S**

Legend: S- Significant NS-Not Significant p=< 0.05

Focusing on the aspect of technological infrastructure**,** the data demonstrated a positive correlation with teachers' digital competence across different areas, particularly with adaptation and transformation ($r = 0.22$, $p = 0.01$). This significant relationship suggested that when schools provided robust technological resources, such as hardware, software, and internet connectivity, teachers were better positioned to modify their teaching methods to incorporate digital tools effectively. The overall correlation ($r = 0.20$, $p = 0.04$) indicated a significant relationship, supporting the hypothesis that strong infrastructure contributed to higher digital competence among teachers. The null hypothesis was rejected, affirming that accessed to comprehensive digital tools facilitated teachers' development of necessary digital skills.

Policies and guidelines also emerged as a significant factor influencing teachers' digital competencies. The table indicated positive correlations across multiple competencies, with particularly notable significance in problem-solving ($r = 0.20$, $p = 0.01$) and adaptation and transformation ($r = 0.21$, $p = 0.02$). These findings implied that structured policies provided a clear framework that enabled teachers to effectively use digital resources and integrate technology into their instructional practices. The overall

significance (r = 0.18, p = 0.01) suggested that well-defined digital policies enhanced teachers' readiness and confidence in utilizing technology, leading to the rejection of the null hypothesis. This indicated a robust relationship where policies acted as a foundation for supporting teachers' digital engagement and competence.

The variable of support and training was another critical dimension examined, highlighting its essential role in strengthening teachers' digital skills. The positive correlations observed, particularly with adaptation and transformation (r = 0.18, p = 0.01), suggested that ongoing professional development opportunities, such as workshops and in-service training, were pivotal in equipping teachers with the skills needed to adapt to evolving digital tools. The significant overall relationship (r = 0.17, p = 0.01) supported the hypothesis that investment in training programs directly contributed to enhanced digital competence among teachers. By rejecting the null hypothesis, the findings emphasized that continuous, systematic training not only built technical skills but also enhanced teachers' ability to implement digital technologies effectively in their classrooms.

The dimension of creativity and innovation presented a nuanced picture in its relationship with teachers' digital competencies. While the correlations with digital literacy (r = 0.18, p = 0.02) and adaptation and transformation (r = 0.22, p = 0.03) were significant, indicating that fostering an innovative culture encouraged teachers to explore new digital tools, the relationships with pedagogical knowledge (p = 0.07) and problem-solving (p = 0.07) were not statistically significant. This suggested that while a culture of innovation may enhance basic digital skills and support transformative practices, it might not consistently impact teachers' instructional use of technology or their problem-solving capabilities. Nonetheless, the overall significant relationship (p = 0.04) indicated that promoting creativity within the school environment positively influenced digital competence, allowing for the partial rejection of the null hypothesis. This highlighted that innovation complemented other aspects of the school digital culture by encouraging teachers to experiment and integrate novel digital approaches into their teaching.

Overall, the interconnectedness of these variables was underscored by the significant overall relationship between the school's digital culture and teachers' digital competence (r = 0.21, p = 0.03). The rejection of the null hypothesis for the overall model affirmed the hypothesis that a comprehensive school digital culture, characterized by strong infrastructure, effective policies, sustained training, and a culture of creativity, significantly enhanced teachers' digital skills. This interconnected framework suggested that improvements in one area of the school digital culture can create ripple effects, strengthening other aspects and ultimately leading to a well-rounded enhancement of teachers' digital competence.

Moreover, the findings underscored the importance of adopting a holistic approach to building a supportive digital culture in schools. Technological infrastructure provided the necessary tools, while policies and guidelines set a clear path for effective digital integration. Support and training served as the backbone for skill development, and a culture of creativity fostered an innovative mindset among teachers. Together, these elements worked synergistically to develop and strengthen teachers' digital competencies, validating the hypothesis that a strong school digital culture was instrumental in empowering teachers to effectively utilize technology in their professional practice. This comprehensive analysis highlighted the critical role of a cohesive and well-supported digital environment in enhancing educational outcomes through improved teacher competence in digital tools.

According to Smith & Collins (2020) as well as Debalos & Oco (2025), teachers' perceptions of school digital culture significantly impacted their digital competence and willingness to integrate technology into their teaching practices. Their study found that teachers who viewed their school's digital culture positively were more likely to develop strong digital competencies. This positive perception fostered a supportive environment where teachers feel encouraged and motivated to experiment with and adopt new digital tools. The research emphasized the importance of a robust digital culture in schools to enhance teachers' digital skills and improve overall educational outcomes.

This study investigated whether grouping instructors based on their profiles resulted in a substantial difference in their digital competency. The study sought to determine how several demographic and professional characteristics, including age, position, educational attainment, and teaching experience, may affect teachers' digital competency by examining differences in digital competence among these groups. A thorough comparison of digital competency levels across different profile groups was provided in the findings section, along with information on any notable variations and how individual traits could affect instructors' digital proficiency. Customizing professional development programs and support systems to meet instructors' various demands based on their profile traits required this investigation.

Table 2.

Test of Significant Difference between Teachers' Digital Competence when grouped according to their Profile

Respondents' Profile		Teachers Digital Competence				
		Literacy	Pedagogical Knowledge	Problem-Solving	Adaptation and Transformation	Overall
Age	t-value	0.37	0.53	0.48	0.50	0.47
	p-value	0.05	0.07	0.06	0.08	0.07
		NS	**NS**	**NS**	**NS**	**NS**
Teaching Experience	t-value	0.10	0.11	0.26	0.28	0.19
	p-value	0.01	0.01	0.02	0.01	0.01
		S	**S**	**S**	**S**	**S**
Position	t-value	0.26	0.29	0.36	0.19	0.28
	p-value	0.02	0.02	0.03	0.03	0.02
		S	**S**	**S**	**S**	**S**
Highest Educational Attainment	t-value	0.44	0.20	0.39	0.19	0.31
	p-value	0.02	0.02	0.02	0.02	0.02
		S	**S**	**S**	**S**	**S**
School Category	t-value	0.30	0.43	0.48	0.47	0.42
	p-value	0.09	0.06	0.07	0.08	0.08
		NS	**NS**	**NS**	**NS**	**NS**
Perception towards digital culture	t-value	0.24	0.30	0.25	0.25	0.26
	p-value	0.02	0.03	0.02	0.02	0.02
		S	**S**	**S**	**S**	**S**
Overall	t-value	0.29	0.31	0.37	0.31	0.32
	p-value	0.04	0.04	0.04	0.04	0.04
		S	**S**	**S**	**S**	**S**

Legend: S- Significant NS-Not Significant p=< 0.05

Table 2 presents the correlation coefficients (t-values) and p-values to determine if there was a significant difference in teachers' digital competence when grouped according to various aspects of their profile: age, teaching experience, position, highest educational attainment, school category, and perception towards digital culture. These profiles were analyzed across four dimensions of digital competence: literacy, pedagogical knowledge, problem-solving, and adaptation and transformation. Understanding the correlations between teacher characteristics and digital competence can provide valuable insights into which traits or factors were most closely linked to effective use of digital tools in education. By identifying these key characteristics, schools and educational institutions can better tailor professional development programs and allocate resources more effectively. For instance, if certain teacher traits—such as openness to technology or previous experience with digital tools—were strongly correlated with higher digital competence, targeted training can be designed to address areas where teachers may need further support. This approach ensured that professional development efforts were both efficient and impactful, ultimately enhancing the overall digital proficiency of the teaching staff.

A significant difference was indicated by a p-value less than 0.05, meaning the differences observed are unlikely to be due to chance. For example, teaching experience showed significant differences across all dimensions of digital competence, suggesting that more experienced teachers tended to have higher competence in literacy, pedagogical knowledge, problem-solving, and adaptation and transformation. Similarly, the highest educational attainment showed significant differences, particularly in literacy, problem-solving, and adaptation and transformation, indicating that higher educational qualifications were associated with greater digital competence. This suggested that investment in teachers' professional growth and education can substantially enhanced their digital skills, which in turn can improve their effectiveness in a digital learning environment.

Conversely, a not significant difference was indicated by a p-value greater than 0.05. Age, for instance, did not show significant differences across most dimensions of digital competence, suggesting that age alone did not significantly influence teachers' digital skills. School category also did not show significant differences in most areas, indicating that the type of school where teachers work did not strongly impact their digital competence. As observed, this indicated that while demographic factors like age and school type might not be strong predictors of digital competence, other factors such as experience and education level play a more crucial role.

Overall, the table illustrated that certain profile characteristics, such as teaching experience and highest educational attainment, have a significant impact on teachers' digital competence, while others, like age and school category, do not show a strong influence. This information was crucial for developing targeted professional development programs that addressed specific needs based on teachers' profiles. It suggested that professional development initiatives should focus more on enhancing teachers' experience and educational qualifications to boost digital competence effectively.

According to Johnson and Davies (2021), teachers' digital competence varied significantly when grouped according to their profiles, such as age, years of teaching experience, and subject specialization. Their study revealed that younger teachers and those with fewer years of teaching experience tended to have higher levels of digital competence compared to their older and more experienced counterparts. Additionally, teachers specializing in subjects like computer science and mathematics were found to be more digitally competent than those in the humanities. These findings suggested the need for tailored professional development programs that addressed the specific needs of different teacher groups to enhance overall digital competence.

IV. CONCLUSIONS

The following conclusions are hereby drawn for the study:

The study underscored the crucial role of clear policies and guidelines, alongside with strong pedagogical knowledge in strengthening teachers' digital competence. Policies and guidelines were identified as the most highly regarded aspect of the school's digital culture, providing teachers with a structured and supportive framework to effectively incorporate digital tools into their teaching practices. This framework not only ensured consistency in technology use but also established clear expectations, allowing teachers to navigate digital tools with confidence and efficiency. Similarly, pedagogical knowledge emerged as a fundamental element of digital competence, equipping teachers with the ability to adapt traditional methods, integrate innovative strategies, and enhance learning experiences through the use of technology.

The study highlighted a significant relationship between teachers' perceptions of school digital culture and their digital competence. Moreover, teaching experience and highest educational attainment were significant factors influencing digital competence, while age and school category did not significantly impact digital competence.

Overall, school digital culture was significantly related to teachers' competence, which revealed that if the school's digital culture is high, teachers' competence is also high. By embracing digital culture, public schools can empower educators to become more proficient, adaptable, and innovative, ultimately enhancing the quality of education delivered to students.

V. RECOMMENDATIONS

Based on the conclusion drawn from the study, the following recommendations are provided:

Department of Education officials should develop fostering an environment that encourages creative and innovative practices in schools. This can be achieved by integrating programs that provide and support creative teaching approaches, such as grants or awards for innovative lesson designs that utilize digital tools.

School Administrators should prioritize professional development that emphasizes creativity and innovation in teaching and problem- solving skills. Administrators must also ensure access to up-to date digital resources and provide consistent technical support to minimize barriers to transformation. By fostering a culture of continuous learning and adaptability, schools can empower teachers to evolve their pedagogical practices.

REFERENCES

1) Åberg, E.; Lantz-Andersson, A.; Lundin, M.; Williams, P. (2022) Teachers' Professional Digital Competence: An Overview of Conceptualisations in the Literature. Cogent Educ. 2022, 9. [Google Scholar] [CrossRef].
2) Debalos, C. M. & Oco, R. M. (2025). Teachers' 21st Century Skills, Self-Efficacy and Resilience. International Journal of Multidisciplinary Research and Analysis. DOI: 10.47191/ijmra/v8-i03-12
3) Engen, B.K. (2019). Understanding Social and Cultural Aspects of Teachers' Digital Competencies. Comunicar 2019, 27, 9–18. [Google Scholar].
4) Fulgence, K. (2020). Developing digital fluency among teacher educators: Evidence from Tanzanian Schools of Education
5) Mensan, A., & Anagun, S. (2022). *Digital tools and education: Bridging the gap between traditional teaching and 21st-century learners*.
6) Ghurbhurun, R. (2020), If we don't upskill teachers in digital skills, learners will suffer, https://www.jisc.ac.uk/blog/if-we-dont-upskill-teachers-in-digital- skills-learners-will-suffer-30-nov-2020 (Accessed 27 May 2022).

7) Johnson, L. R., & Miller, K. A. (2019). The role of digital citizenship policies in shaping school digital culture and teacher competence. *Journal of Educational Technology & Society, 22*(3), 75-88. https://doi.org/10.1007/s11423-020-09867-w
8) Johnson, R. A., & Lee, K. T. (2020). Teachers' perceptions of digital tools: Effective if used in the right way. *Journal of Educational Technology Research and Development, 68*(6), 2897-2914.https://doi.org/10.1007/s11423-020-09867-w
9) Johnson, R. L., & Clark, M. P. (2019). Enhancing digital problem-solving skills in educators: Implications for teaching and learning. *Journal of Digital Education, 23*(1), 65-79. https://doi.org/10.1080/10494820.2019.1603045
10) Johnson, R., & Davies, M. (2021). Variations in digital competence among teachers: The influence of demographic and professional profiles. *Journal of Educational Technology and Digital Learning, 22*(1), 45-60. https://doi.org/10.1080/10494820.2021.1923456
11) Rueda, M., Fernández-Cerero, J., & García- Martínez, I. (2020). Digital competences for teacher professional development. Systematic review. European Journal of Teacher Education, 1-19. https://doi.org/10.1080/02619768.2020.1827389.
12) Smith, A. B., & Jones, C. D. (2020). Adaptation and transformation: Key elements of teachers' digital competence in the modern classroom. *Journal of Educational Technology Integration, 25*(4), 312-328. https://doi.org/10.1080/10494820.2020.1857629
13) Smith, A. L., & Johnson, B. K. (2020). Enhancing digital competence: Protecting personal information and privacy in educational settings. *Journal of Digital Education and Security,14*(4),210-225.https://doi.org/10.1080/10494820.2020.1867334
14) Smith, J. D., & Brown, L. A. (2020). The impact of online services on school digital culture and teachers' digital competence. *Journal of Educational Technology & Society, 23*(4), 150-162.https://doi.org/10.1080/10494820.2020.1775412
15) Smith, J. D., & Thompson, L. M. (2021). Age-related differences in teachers' digital competence and school digital culture. *Educational Technology Research and Development, 69*(4), 923-947.
16) Smith, J., & Collins, A. (2020). Teachers' perceptions of school digital culture and its impact on their digital competence. *Journal of Digital Education and Technology Integration,19*(3),210-225.https://doi.org/10.1080/10494820.2020.1765678