DIGITALLY PROFICIENT TEACHERS: A REVIEW

Prof. Manoj Kumar Saxena

Dean & Head, School of Education, Central University of Himachal Pradesh

Dharamshala (HP), Email- drmanojksaxena@gmail.com

Lobzang Chhodan

Research Scholar, School of Education, Central University of Himachal Pradesh

Dharamshala (HP), Email- lobzangchhodan@gmail.com

Abstract

Integration of Information and Communication Technology (ICT) in the education system and digitally empowered teachers play a vital role in paving the way for digital citizenship. The 21st century is called the age of technology as new technologies are being invented rapidly. The progress in technological field has made people's lives enjoyable and congenial. Digital proficiency and availability of ICT resources are essential to make the teaching-learning process effective and interesting. Teachers' optimistic outlook significantly influences their willingness to adopt ICT in classrooms. In the light of ever-changing usage of digital technology, the concept of teachers' digital competence still appears to be vague and elusive. However, the integration of ICT resources depends on teachers' attitudes as well as other factors such as teachers' digital proficiency, technical skills, diverse teaching needs and optimal use of technology. Academic research on teachers' digital competency is expanding in this current era. The primarily focus of present paper is better understanding of the current status of digitally proficient teachers, and their attitude towards utilizing ICT resources along with the integration of ICT resources in teaching, and different factors impacting digital proficiency among teachers. Furthermore, by reviewing existing literature, the paper underlines the importance of equipping teachers with digital competencies to promote a future-ready learning environment.

Keywords: *Digital Proficiency, ICT Resources, Technology Integration, Teacher Education*

Introduction:

Modernity in the sphere of education is enhanced with the effective use of ICT resources in the teaching-learning process. Technology has brought tremendous advancements in the field

of education **(**Saxena and Singh,2023). Information and communication technology (ICT) emphasizes the use of a variety of virtual tools and resources to transmit information effectively and efficiently (Zafar, 2019). ICT facilitates access to information, simplifies tasks, and connects people to work together. The growing popularity of ICT resources makes it an important part in education, business, health and many other fields. In this era of digital technology, opportunities of ICT integration in educational setting and empowering teachers are increasing. In the modern era, the concept of a digitally enabled citizen has gained importance at the national and international level as digitalization has played a vital role in inspiring various educational reforms (Erstad et al., 2021). The integration of ICT resources not only enhances digital proficiency among teachers but also improves the overall quality of teaching- learning process in educational institutions. Integrating technology into education is widely recognized as a key driver in achieving the goal of educational practices and enhancing instructional quality (Cetinkaya, 2017). Information and communication technology provides teachers and students with the opportunity to access many e- resources like AI, virtual labs, online courses, cloud computing etc. (Babu and MA, 2018). Teachers' technical proficiency, the choice of relevant digital resources, right approach for utilising technology and student engagement are crucial (Rice, 2021). This review paper explores key aspects of digitalisation in education, examines existing research on teachers' digital competence and identifies best practices for integrating ICT in education.

Digital Proficiency:

Digital proficiency is a skill essential for the 21st century that can be utilized in educational, professional, and recreational pursuits. "Digital proficiency is a collection of abilities, information, and mindsets that enable an individual to use digital technology to accomplish objectives in a various life situation" (Baartman & de Bruijn, 2011; Ferrari et al., 2012). Moreover, digital proficiency referred as the ability to use digital tools and platforms confidently whether it is for personal, academic, or professional purposes. It includes activities such as using smart phones, computers, internet to interact, find information, solve problems, and reach a work or personal goal.

Levels of Digital Proficiency: there are three different levels of digital proficiency:

Literacy: The level of digital proficiency includes basic capacities that enable people to engage and successfully function in the digital world. This entails a capacity to read, write, and interact with digital world which allows a person to consume and produce information in both analogy and digital forms.

Fluency: Digital skills become instinctive at this level so it will be easier for the teacher to perform different educational tasks easily, accurately, and efficiently.

Mastery: This level shows the creative use of digital tools and their abilities to solve problems by applying above both levels that helps them to think beyond their original purposes and explore new ideas in an effective manner.

Teachers' Attitude and Utilization of ICT Resources:

Attitude refers to a person's mindset, beliefs, and feelings toward people, situations, or objects, influencing their behavior and reactions. It can be positive, negative, or neutral and is shaped by experiences, culture, and personal values. Attitudes play a key role in decision-making, communication, and relationships. The attitude of teachers plays a crucial role in shaping the learning environment and influencing students' academic and personal growth. Teachers with a growth mindset are open to new teaching methods, embrace challenges, and continuously seek professional development. Teachers' digital competencies and positive attitudes can be useful in facilitating access to better educational content, efficient teaching strategies, enabling learner support networks in both face-to-face and distance education settings (Chauhan & Sharma, 2023). Similarly, in their study, Ajzen and Fishbein, (1980) observed that attitude of teachers' also affects classroom management, student-teacher relationships, and overall school culture. Sánchez et al. (2012) explained that although, teachers have a positive attitude towards the use of ICT, but due to the perception that it is an advanced process, its use in the classroom on a daily basis is minimal. Again, in a descriptive survey Mehar et al., (2020) examined that most of the teachers (60%) have a strongly positive attitude towards the utilization ICT resources and there is no notable variation on the basis of gender and stream. Internal (such as attitudes towards computers and the internet, knowledge, and self-confidence) and External (such as perceived support) factors affect the degree of ICT usage among teachers and ICT integration in at very early phase (Tezci, 2011; Beri and Sharma,2019). In another study, it has been observed that in Primary classroom teachers often encounter several challenges when integrating ICT in teaching- learning process (Undi and Hashim, 2021). In their discussion, Mahajan (2016) found that only a very few (25%) of teachers had a favourable attitude toward using technology in teaching. Dixit and Kaur, (2015) revealed that the geographical area of teachers does not lead to variances in their attitudes toward utilizing information and communication technology. Likewise, in another investigation researcher examined teachers' attitudes towards the use of ICT and its impact on their academic achievement and discovered that teachers generally had positive attitudes

regarding the use of ICT in their educational practices(Agarwal and Ahuja, 2013). Johannesen et al., (2014) demonstrated that teachers' digital attitudes are influenced by their personal strengths and emotions.

Teachers' digital proficiency for integration of ICT resources in their teaching:

Teachers play a pivotal role in the process of teaching and learning by utilizing ICT for developing better digital competencies among students. This is because ICT can foster an engaging and interactive learning environment (Arnseth & Hatlevik, 2010). The influence and function of technology have completely changed our day-to-day activities (Saxena and Hans,2018). In the teaching and learning process, a teacher plays a crucial role, so that he or she must be familiar with the proper functioning of computers and how to utilize them for the benefit of his or her students (Saxena et al.,2019). In this digital age, knowledge about various ICT tools will be given to students so that they may be able to learn and apply the skills necessary for the 21st century (Hatlevik, 2017). In the words of Gómez and Granados (2013), the modern educational world requires teachers who can adapt to the difficulties posed by a reality that is becoming more complex and dynamic. In their study Olofsson et al. (2019) concluded that teachers strive to demonstrate and implement adequate digital competence in relation to technological and pedagogical challenges. As life and technology grow increasingly complex, educators need to embrace these changes to guide students effectively.

Enhancing digital literacy skills among teachers:

Digital literacy refers to the competency in utilizing digital tools for various purposes, including accessing, analyzing, synthesizing, managing, integrating, sharing, and communicating information, as well as creating new knowledge in the classroom environment. This competency is enhanced by information literacy, learning skills, critical thinking abilities, emotional intelligence, and social skills (Limna et al., 2023; Techataweewan & Prasertsin, 2018). The effective integration of ICT in education is crucial, and when utilized effectively, it can greatly benefit both teachers and students within the classroom. Additionally, ICT presents opportunities for developing skills, expanding knowledge, and promoting lifelong learning. As ICT provides more opportunities for students and teachers, learning and teaching can be adapted to individual needs forcing public schools to respond appropriately to this technological innovation (Mikre,2011). (Temirkhanova et al., (2024) found that digitally literate teachers significantly improved students' skills in using virtual reality, mobile apps, and digital tools, fostering interactive and creative learning

environments and highlighted the importance of training teachers in digital technologies world, showed how systematic digital literacy enhances educational practices and aligns with Generation Z's learning needs Student. (Blackwell et al., 2014)in their study indicated that a favourable attitude toward technology enhances students' competencies in a dynamic world.

Different factors impacting the digital proficiency among teachers:

(Androniceanu et al.,2023) in their study indicated that digital competencies are primarily influenced by social factors, extrinsic motivation, and administrative or managerial aspects. (Turel and Johnson, 2012) further highlighted that Teachers encounter major barriers due to technological issues which includes poor connectivity, malware, and malfunctioning printers. The findings further revealed that several teacher-specific variables play a significant role in the adoption of innovative ICT usage in classrooms. Moreover, in other study (Afshari et al., 2009) recommended that there is lack of enthusiasm among the management of teacher training institutions for incorporating ICT into the curriculum. (Hinojo-Lucena et al.,2019) further demonstrated that teachers have low digital competence, age, type of school, ICT training, qualifications, teaching experience, and rank which are influencing their technological skills. (Keong et al., 2005) additionally founded that teachers are not making optimal use of ICT tools in their teaching. They noted several barriers in their study that are related to ICT which affect classroom teaching (Althubyanu,2024) in his study revealed that 58.4% of teachers possessed average digital competence, while 78% held positive perceptions toward integrating digital technologies in education. Furthermore, the study indicated that perceived usefulness and subjective norms directly impact teachers' digital competence

Educational Suggestion:

The review presented in the paper concludes that targeted ICT training and support are needed to improve teachers' digital proficiency. The following educational suggestions may help enhance digital proficiency:

- Conduct regular training workshops for teachers and students on basic and advanced digital tools, focusing on software relevant to educational needs, such as online learning platforms, educational apps, and data management tools.
- School's programs should consider age, experience, and training taken before designing their programs.
- ICT labs or resource centers should be of high quality , provided with modern devices, high-speed internet, and support staff to provide hands-on learning practice.

- Install solar panel systems to generate power to support the equipment used for ICT at stations with poor and/or unstable electricity supply. This helps the teachers to use digital equipment and devices without any interruption.

- Offline copies of learning material shall be distributed by preloaded devices, USB drives, or mobile applications that operate without any dependence on internet connectivity.

- Maintenance of equipment and technical assistance shall be provided frequently to curb interruptions of teaching learning activities.

- Offer specially crafted ICT training sessions for teachers on planning lessons, effective online classroom management, and maximally utilizing multimedia in the classrooms.

- Ensure the schools have stable internet connections for research, e-learning, and access to reading materials.

- Implement interactive whiteboards instead of using traditional blackboards to enhance visual learning and promote participatory learning among the students.

- Educate the students and the teachers on online safety principles, detect phishing attempts, safeguard their personal information, and sensitize them periodically so that they would not visit malicious or unsafe sites.

- Create community ICT centers in rural settings or small towns that offer access to computers, printers, and internet services for students and educators outside of regular school hours.

- Encourage government initiatives to fund and implement information and communication technology projects in disadvantaged areas, focusing on infrastructure development and financial support for digital resources.

Conclusion:

The 21st century marks a period of tremendous scientific and technological advancements, as gauged through the tremendous emergence of innovative technologies in almost every department. These ICT resources and basic digital skills are necessary for enhancing the quality of teaching learned in the modern civilization of today's societies. The provision of tools and the ability to use them are decisive factors for creating an enabling environment for fun and interacting learning environments. Although educators in general acknowledge the importance of ICT, many barriers, including a lack of infrastructure, limited training opportunities, and poor technical support, prevent its effective implementation in classrooms. The use of ICT in education is crucial for developing digitally competent teachers and

ensuring that students participate in modern, technology-based learning experiences, which ultimately leads to better educational outcomes. By analyzing different studies, it is found that digital proficiency can be developed by providing hands-on training with ICT tools, ensuring regular access to modern resources like computers, software, and the internet. Moreover, the integration of ICT into teaching practices helps in enhancing teachers' confidence and skills in using technology effectively in the dynamic world.

References

Afshari, M., Bakar, K.A., Luan, W. S., Samah, B.A., & Fooi, F. S. (2009). Factors affecting teachers' use of information and communication technology. International journal of instruction, 2(1).

Agarwal, D., & Ahuja, D. S. (2013). Attitude of student-teachers towards the use of ICT and its impact on their academic achievement. Indian Journal of Applied Research, 3(7), 186–187. https://doi.org/10.15373/2249555X/JULY2013/57

Ajzen, I., & Fishbein, M. (1980). Understanding attitudes and predicting social behaviour. Englewood Cliffs, NJ: Prentice- Hall.

Althubyani, A. R. (2 024). Digital competence of teachers and the factors affecting their competence level: A nationwide mixed-methods study. Sustainability, 16(7), 2796. https://doi.org/10.3390/su16072796

Androniceanu, A., Sabie, O.-M., Georgescu, I., & Drugau-Constantin, A.-L. (2023). Main factors and causes that are influencing the digital competences of human resources. Administratie Si Management Public, 41, 26–53. https://doi.org/10.24818/amp/2023.41-02

Arnseth, H. C., & Hatlevik, O. E. (2010). Challenges in Aligning Pedagogical Practices and Pupils' Competencies with the Information Society's Demands. In IGI Global eBooks (pp. 266–280). https://doi.org/10.4018/978-1-61520-909-5.ch014

Baartman, L. K. J., & De Bruijn, E. (2011). Integrating knowledge, skills and attitudes: Conceptualising learning processes towards vocational competence. Educational Research Review, 6(2), 125–134. https://doi.org/10.1016/j.edurev.2011.03.001

Babu, G. S., & MA, K. S. (2018). Role of information and Communication Technology (ICT) in higher education: A study. International Journal of Multidisciplinary Education and Research, 9(5), 103-109.

Beri, N., & Sharma, L. (2019). Teachers' attitude towards integrating ICT in teacher education. International Journal of Innovative Technology and Exploring Engineering, 8(8), 285-295.

Cetinkaya, L. (2017). An educational technology tool that developed in the natural flow of life among students: WhatsApp. International Journal of Progressive Education, 13(2), 29-47.

Dixit, M., & Kaur, M. (2015). Attitude of Teachers trainees towards ICT teaching. International Journal of Pure and Applied Researches, 1(1), 169-174.

Erstad, O., Kjällander, S., & Järvelä, S. (2021). Facing the challenges of 'digital competence': A Nordic agenda for curriculum development for the 21st century. Nordic Journal of Digital Literacy, 16(2), 77–87. https://doi.org/10.18261/issn.1891-943x-2021-02-0

Ferrari, A., Punie, Y., & Redecker, C. (2012). Understanding digital competence in the 21st century: An analysis of current frameworks. In A. Ravenscroft, S. Lindstaedt, C. D. Kloos, & D. Hernández-Leo (Eds.), 21st Century Learning for 21st Century Skills (Vol. 7563, pp. 79–92). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-33263-0_7

Gómez, Á. P., & Granados, L. P. (2013). Competencias docentes en la era digital. La formación del pensamiento práctico. Temas de Educación, 19(1), 67-84.

Hatlevik, O. E. (2017). Examining the relationship between teachers' self-efficacy, their digital competence, strategies to evaluate information, and use of ict at school. Scandinavian Journal of Educational Research, 61(5), 555–567. https://doi.org/10.1080/00313831.2016.1172501

Hinojo-Lucena, F.-J., Aznar-Diaz, I., Caceres-Reche, M.-P., Trujillo-Torres, J.-M., & Romero-Rodriguez, J.-M. (2019). Factors influencing the development of digital competence in teachers: Analysis of the teaching staff of permanent education centres. IEEE Access, 7, 178744–178752. https://doi.org/10.1109/ACCESS.2019.2957438

Johannesen, M., Øgrim, L., & Giæver, T. H. (2014). Notionin motion: Teachers' digital competence. NordicJournal of Digital Literacy, 9(4), 300–3012. https://doi.org/10.18261/1891-943X-2014-04-05

Keong, C. C., Horani, S., & Daniel, J. (2005). A study on the use of ICT in mathematics teaching. Malaysian online journal of instructional Technology, 2(3), 43-51.

Limna, P., Kraiwanit, T., & Siripipatthanakul, S., (2023). The growing trend of digital economy: A review article. International Journal of Computing Sciences Research, 7, 1351–1361. https://doi.org/10.25147/ijcsr.2017.001.1.106

Mahajan, G. (2016). Attitude of teachers towards the use of technology in teaching. Educational Quest- An International Journal of Education and Applied Social Sciences, 7(2), 141. https://doi.org/10.5958/2230-7311.2016.00031.3

Meher, V., Baral, R., & Suna, G. (2020). Attitude of Teachers About the Use of Information and Communication Technology (ICTs) in Teaching-Learning Process. Education for Social Inclusion, Sustainable Development and Empowerment

Mikre, F. (2011). The roles of information communication technologies in education: Review article with emphasis to the computer and internet. Ethiopian journal of education and sciences, 6(2), 109-126.

Olofsson, A. D., Fransson, G., & Lindberg, J. O. (2020). A study of the use of digital technology and its conditions with a view to understanding what 'adequate digital competence' may mean in a national policy initiative. Educational Studies, 46(6), 727–743. https://doi.org/10.1080/03055698.2019.1651694

Rice, M. F. (2021). Reconceptualizing teacher professional learning about technology integration as intra-active entanglements. Professional Development in Education, 47(2–3), 524–537. https://doi.org/10.1080/19415257.2021.1891953

Sánchez, A.-B., Marcos, J.-J. M., González, M., & GuanLin, H. (2012). In service teachers' attitudes towards the use of ict in the classroom. Procedia - Social and Behavioral Sciences, 46, 1358–1364. https://doi.org/10.1016/j.sbspro.2012.05.30

Saxena, M. K., & Hans, D. (2020). ICT: An Agent of Happiness in Education. BRICS Journal of Educational Research, 2, 3(8), 44-47.

Saxena, M. K., & Singh, A. (2023). Open Educational Resources and Intellectual Property Rights: A Study on the awareness of OER and IPR among Elementary Teacher Educators. Indian Journal of Educational Technology, 5(II), 153–162. Retrieved from https://journals.ncert.gov.in/IJET/article/view/576

Saxena, M.K., Kumar, S. & Singh, A. (2019). Computer anxiety and individual failure in computer usage among teacher educators of universities and colleges: A study on FDP participants. International Journal of Information Dissemination and Technology, 9(4), 191-195.

Techataweewan, W., & Prasertsin, U. (2018). Development of digital literacy indicators for Thai undergraduate students using mixed method research. Kasetsart Journal of Social Sciences, 39(2), 215–221. https://doi.org/10.1016/j.kjss.2017.07.001

Temirkhanova, M., Abildinova, G., & Karaca, C. (2024). Enhancing digital literacy skills among teachers for effective integration of computer science and design education: A case study at Astana International School, Kazakhstan. Frontiers in Education, 9, 1408512. https://doi.org/10.3389/feduc.2024.1408512

Tezci, E. (2011). Factors that influence pre-service teachers' ICT usage in education. European Journal of Teacher Education, 34(4), 483–499. https://doi.org/10.1080/02619768.2011.587116

Turel, Y. K., & Johnson, T. E. (2012). Teachers' belief and use of interactive whiteboards for teaching and learning. Journal of Educational Technology & Society, 15(1), 381-394.

Undi, V. A., & Hashim, H. (2021). The demands of 21st century learning: A study on primary school teachers' attitudes towards using ICT in english as a second language (Esl) classroom.Creative Education, 12(07), 1666–1678. https://doi.org/10.4236/ce.2021.127127

Zafar, T. (2019). Role of information communication technology (ICT) in education and its relative impact. International Journal of Engineering Research & Technology (IJERT), 7(04), 1-10.