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Digital Literacy Competencies and Challenges Faced by Secondary School Teachers at District Peshawar

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Abstract: *This study aimed to assess the level of digital literacy, access to ICT tools, challenges to integration, and professional development needs among secondary school teachers in District Peshawar, Pakistan. Using a descriptive quantitative survey design, data were collected from 200 teachers through a structured questionnaire. According to the findings, most teachers had the basic digital competencies like using MS office, internet search, email used in communication but there were some serious lags in advanced skills, these were the use of learning management systems (LMS), development of digital teaching aids, and differentiation of teaching using technology. Factor that impedes successful integration of ICT as identified in the study include infrastructural and systemic juxtaposition such as having no reliable internet connection, inadequate electronic facilities in schools, and administrative assistant. In addition to the above, time limitations and irrelevancy of training content hindered the possibility of teachers being able to use digital tools effectively in the classroom. Even though these obstacles are real, most of the teachers were interested in attending digital skills training, especially in the form of hands-on (classroom-based), or mixed (hybrid), training. They were also aware of the significance of lifelong learning in terms of keeping abreast of current educational technology. Although the study shows a certain degree of fundamental digital readiness among educators, it is basically the systemic guidance and better-founded area-specific preparation that is critical in closing the gap between the digital availability and innovation in the classroom environment. Some of the major recommendations were to enhance ICT infrastructure, continuous training on the basis of need and support institutional effectiveness to promote a lasting process of the integration of ICT in education.*

Introduction

The digital revolution virtually changed the educational environment by opening up new pedagogical prospects, personalizing learning and changing the role of teachers and the students. The digital tools

and resources have facilitated more interactive and student-centered learning environment and their usage has enjoyed collaboration, critical thinking, and access to a tremendous amount of online knowledge (Means et al., 2010). The involvement of Information and Communication Technology (ICT) in the educational sector has become vital constituent of the current systems of teaching and learning in education because it is a tool that has boosted the qualitative level of teaching and learning (Kozma, 2005).

In Pakistan, the government has taken several steps towards encouraging ICT integration and the most outstanding government initiative in this regard is Digital Pakistan Vision that tries to modernize the digital infrastructure in all areas including the education sector (Ministry of Information Technology and Telecommunication (Mott 2020). This vision is focused on the added digital skills and enhancement of access to the internet and incorporation of digital technologies in schools, colleges and universities to equip students with what is required in the global digital economy.

Although the government is taking a strategic direction to implement digital literacy in the school system especially at the secondary level, the actual process is not sound and uniform. Some of the obstacles hindering the process are a poor ICT network, poor internet access, low budget, and shortage of qualified teachers to handle proper digital pedagogy (Mahmood & Bokhari, 2020; Qureshi et al., 2012). All of these problems are particularly acute in rural and underprivileged settings, where schools do not even have minimal computer resources (Rehmani, 2013). Moreover, a significant number of factors that cause low confidence among teachers when using digital tools are lack of structured professional development courses and support provided by the institution (Farooq & Aslam, 2020).

Statements of the Problem

Although digital literacy has become a core 21st-century teaching and learning skill, many secondary school teachers in District Peshawar still lack adequate digital competencies and effective ICT integration in classrooms. Digital literacy goes beyond basic computer use to include the ability to analyse digital information, teach with educational tools, and adapt to evolving technologies (Ng, 2012). However, most of the teachers in Pakistan, including Peshawar, lack training and institutional support in this regard (Farooq & Aslam, 2020; Mahmood & Bokhari, 2020).

While teachers may be aware of ICT tools, their use in the classroom is constrained by the lack of proper professional development, infrastructure, internet connection, technical support and the pressure of the curriculum that limits innovation (Gulbahar, 2008; Qureshi et al., 2012). Other factors that are seen to be an obstacle are reluctance to change, lack of motivation, and fear of technology (Hussain, 2014). These issues are especially acute in Khyber Pakhtunkhwa, where digital divides are exacerbated by inequalities in the distribution of resources between urban and rural schools (UNESCO, 2022).

Against this backdrop, the study attempts to determine the level of digital literacy of secondary school teachers in District Peshawar and determine the barriers constraining the use of ICT to provide input for policy development and need-based interventions for professional training.

Objectives of the Study

- To assess the digital literacy competencies of secondary school teachers in District Peshawar.
- To identify the challenges faced by teachers in integrating ICT tools in teaching.
- To analyse the relationship between demographic factors and digital literacy levels.
- To provide recommendations for improving digital competency among teachers.

Research Questions

1.   What is the level of digital literacy among secondary school teachers in District Peshawar?
2.   What challenges do these teachers face in using ICT in the classroom?
3.   How do demographic factors influence digital literacy levels?
4.   What strategies can enhance digital literacy and overcome challenges?

Significance of the Study

The results of this study will be very essential in guiding the relevant stakeholders (policy makers, teacher education institutions, curriculum developers and school administrators) to make proper decisions in integrating ICT into the secondary education. By thoroughly analyzing teachers' digital literacy levels and pinpointing the obstacles that are specific to using ICT tools, this study offers an empirical basis for designing and implementing the specific and context-sensitive interventions. These can include the design of customized PD programs that address both technical skills and pedagogical approaches to technology-enhanced learning, the offer of regular technical assistance, the setup of digital resource hubs and the enhancement of ICT infrastructure in poorly equipped schools. (Kozma, 2005; Law et al., 2008).

Literature Review

Concept of Digital Literacy

The term digital literacy has seen a drastic change since its introduction by Gilster (1997) who defined it as the ability to use and comprehend information in a variety of formats as brought out by a myriad of information when the information is presented on computers. Modern digital literacy has a wider range of competencies that exceed general usage of a computer. It entails the ability to go online, read, write, and communicate, and produce information with the use of digital technologies, as well as being able to be safe and a responsible digital citizen (Ng, 2012; Belshaw, 2011).

Digital literacy cannot be considered as a fixed or definite skill but a multi-dimensional concept combining mastery of digital environment, reflective thinking, sensitivity to ethics and communicative expertise (Buckingham, 2007). It will not only outdictize on skills to use the digital devices, but also needs cognitive and social competencies to critically evaluate and intensely examine the digital content, decision making and online collaboration (Eshet-Alkalai, 2004).

Digital literacy in the educational context represents the capability of educators and students to explore the digital applications in terms of achieving different educational purposes. Among teachers, this involves the use of Learning Management Systems (LMS), interactivity software, multimedia content, digital assessment tools, and communication platforms to support instruction, act on the intelligence of learners, and increase education auspices (Reddy et al., 2020).

The Significance of Digital Literacy in Education

Digital literacy is one of the core skills of the modern-day educational environment of the 21st century, both of that of teachers and learners alike. Since schools are shifting towards blended and online classes, digital literacy is increasingly becoming central in transforming the teaching and learning experience in classrooms, classroom collaborations, and even the performance of students (Hobbs, 2010; Voogt et al., 2013). As far as educators are concerned, digital literacy grants them the ability to create collaborative, learner-centered, and engaging instructional space employing multimedia resources, online simulations, virtual labs, and collaborative uses of digital environments. Not only does this enhance the teaching and learning process but also it enhances needs and various learning styles of students (Beetham & Sharpe, 2010).

In case of students, digital literacy enables them to develop critical thinking, creativity, collaborative,

and problem-solving competencies that are essential to the current knowledge-based economy (Voogt & Roblin, 2012). It equips them with the role of informed, responsible, and adaptive digital citizens who are able to operate in complex realms of digital environments within the academic and vocational spaces.

Worldwide Tendencies of Teacher Digital Competencies

Digital technologies are rapidly progressing almost all over the world, which results in the major changes in teacher education systems, especially on the development of digital competencies of teachers. Education systems of countries that have achieved top positions in global literacy such as Finland, South Korea, Singapore and the United Kingdom recognize digital literacy as much more than a technical skill set, but a part of their pedagogical and professional growth systems. To ensure that teachers allow greater use of ICT in lesson planning, instruction delivery, formative assessment, and collaboration with each other, these countries have persevered to integrate ICT training into their pre-service teacher education and continuing education (UNESCO, 2019; OECD, 2016).

In another example, Finland incorporates digital pedagogy in its teacher training programs to stimulate prospective teachers to engage in individualized learning and differentiated instructions through the use of technology. The Finnish teachers are also being motivated to participate in the creation of digital content and educational research (Kumpulainen, 2014). The government in South Korea has also established nationwide schemes like the so-called Smart Education which offers great ICT infrastructure as well as guarantees that teachers continue to get training in terms of digital tool usage, content curation, and e-learning facilitation (Yoon, 2013). On a similar line, the mission of the Education Technology Strategy of the UK is to develop digital confidence in teachers and offers them specific resources (such as technological learning platforms, like the National Centre for Computing Education) (DfE, 2019).

The trends international experience shows that there is a visible coordination in policy and practice in successful countries: national strategy on education centers on ICT, teacher education institutions integrate it in curricula and schools are equipped with the goods they need and with technical assistance. Furthermore, frameworks to describe and measure the digital competence of teachers like the European Digital Competence Framework for Educators (DigCompEdu) are available with well-organized guidance on how to evaluate and develop the digital skills of educators both at teacher- and school-levels in the areas of digital pedagogy, assessment, and learner empowerment (Redecker, 2017).

CT application within the Pakistani schools

In Pakistan, the introduction of Information and Communication Technology (ICT) in the education system has been determined as a priority policy element of enhancing access, quality and equity in education. Key government decisions to make education digital and develop the potential of the teaching professionals accompanied by the extension of digital services to the remote and underserved regions include the publication of the National Education Policy (2009) and the emergence of the Digital Pakistan Vision (2020) (Government of Pakistan, 2009; MOITT, 2020). Such policies promote such improvements in the curriculum as the inclusion of ICT skills, creation of computer laboratories, and pedagogical professional development.

Nonetheless, integration of ICT has been quite slow and very erratic, especially in the secondary schools. Research regularly identifies systemic problems as the backward infrastructure, poor access to computers as well as internet connectivity, power shortage and the limited number of trained individuals capable of supporting and managing ICT within the school levels (Shah & Khan, 2020; Farooq & Aslam, 2020). Lack of proper hardware maintenance, lack of funding to support the ICT labs, and lack

of any technical support are some of the factors that can make the use of the ICT labs bare in terms of functionality in many public sector schools particularly in rural and underprivileged areas like parts of Khyber Pakhtunkhwa (Rehmani, 2013; Qureshi et al., 2012).

Also, even with the implementation of policies, there is a mismatch between the national level objectives of ICT and the very digital preparedness of school teachers. Teachers with basic ICT knowledge do not know how to effectively integrate digital tools into their classroom practice because many of them do not receive the pedagogical training needed (Mahmood & Bokhari, 2020).

Obstacles to Adoption of ICT

Although the world has focused on digital transformation in the education sector, implementation and efficient use of information and communication technology (ICT) in education institutions, especially in the developing nations, is still plagued with a lot of challenges. Such problems are complex and interdependent and include infrastructural shortage, weak teacher competence, cultural and organisational resistance, and curriculum mismatch (Trucano, 2005; Haddad, 2007).

The first of the challenges is that of the shortage of ICT infrastructure particularly in rural and resource limited environments. The problem is that schools in Mexico routinely use out-of-date and dysfunctional computer equipment, there is inadequate electrical power, and there is little to no access to the fast internet. These structures obstruct the utilization of digital tools in the classroom in their everyday use and prevent the technology to be introduced in the learning process by both teachers and students (Qureshi et al., 2012). Lack of budget and weak maintenance in many developing countries such as Pakistan also adds fuel to the situation which leads to inefficient use of ICT investments (Shah & Khan, 2020).

The second institutional threat is the lack of teacher training and professional growth. Educators who do not have the needed digital skills and pedagogical knowledge to make use of technology in their lessons efficiently are predominant among educated teachers, especially those who have got training within the framework of traditional pedagogy (Mahmood & Bokhari, 2020). When training opportunities are available, they tend to be isolated and brief, and those who take them never experience the training in the classroom (Farooq & Aslam, 2020). Without regular, on-going, and practice-related training, teachers have difficulties to develop self-confidence to use the ICT tools as well as applying the tools in meaningful teaching. Another major barrier to change is resistance to change. The problem is that teachers might regard the integration of ICT as another burden as there is a possibility of another load the enhancement of efficiency in teaching. This is usually anchored in fears of technology, concerns of increased work load or lack of relevance to subjects that they teach (Pelgrum, 2001). Moreover, the leadership of the school is a crucial factor during the adoption of ICT; unless certain principals and administrators possess the necessary knowledge and digital literacy as well as encourage the use of technology in the classroom, the success of the process will be considerably low (Tondeur et al., 2017).

Another issue that brings about difficulty is curriculum misalignment. In most education systems, national curriculum does not consider ICT integration. Syllabi are not always flexible, exam-centred and over-detailed, which does not allow much space to digital tools or student-centred practices (Trucano, 2005). Verbatim, curriculum without a clear integration of digital skills and pedagogical affability makes it problematic to actually integrate ICT in everyday learning (Voogt & Roblin, 2012).

Digital Literacy among Secondary School Teachers in Pakistan

In Pakistan's education system, digital literacy among secondary school teachers requires urgent attention. Despite national initiatives such as the Digital Pakistan Vision and ongoing efforts toward educational digitalization, teachers' preparedness and digital skills remain inconsistent across regions

and even within the same schools. Digital competence is essential not only for effective ICT use in classrooms but also for preparing students to thrive in a knowledge-based society. This section examines teachers' current digital literacy levels, disparities between urban and rural contexts, and their perceptions, challenges, and professional development needs.

Current Status of Teachers' Digital Literacy

Overall, digital literacy in Pakistan is shown to be only average to low among secondary school teachers. While many hold basic ICT skills like operating the computers, using MS Office, and browsing online, they lack pedagogical application of the same in the teaching (Mahmood and Bokhari, 2020). Although some teachers give importance to projectors, online platforms, and multimedia tools, the majority continues to use the usual "chalk and talk" approach (Farooq & Aslam, 2020). The COVID-19 pandemic also highlighted gaps in preparedness when teachers faced the challenges of online platforms, digital content creation, and student assessment due to limited institutional training and ad hoc professional development opportunities (Ali et al., 2021).

Urban–Rural Disparities

There's a big digital gap between urban and rural schools. The big cities (Lahore, Islamabad, Peshawar) tend to have better ICT infrastructure, training and technical resources. In contrast, computer labs, electricity and internet are not available in rural schools, depriving teachers of learning digital skills (Qureshi et al., 2012; Rehmani, 2013). Often, the imbalance in the average economic situations of the provinces, the uneven distribution of funding to the provinces, and the centralization of training institutes in urban locations also contribute to the disparity. In the case of Khyber Pakhtunkhwa, for example, infrastructure limitations and insufficient long-term support in the rural districts continue to reduce teachers' digital preparedness (Shah & Khan, 2020). Without policy interventions, any drive toward increased ICT penetration will be inequitable and ineffective.

Teachers' Perceptions and Self-Efficacy

Teachers' attitudes and self-efficacy play a pivotal role in ICT adoption. While many acknowledge the importance of technology in modern education, a significant proportion feel unprepared or resistant due to low confidence, fear of errors, or reluctance to alter traditional teaching methods (Hussain, 2014). Research suggests that teachers with low digital self-efficacy avoid ICT even when resources are available (Pelgrum, 2001). A lack of peer support and mentoring further discourages engagement, whereas continuous training, recognition, and exposure to user-friendly platforms foster confidence and innovation (Tondeur et al., 2017). Building digital self-efficacy through consistent support and professional development is therefore crucial for cultivating a culture of meaningful ICT integration in schools.

Methodology

Research Design

The study had a quantitative survey design of descriptive nature in order to collect quantitative data about teachers' thoughts, skills and experiences of digital literacy. The design involved the description of the status quo of teacher digital literacy, identification of common problems of ICT integration, and analysis of the correlation between levels of digital literacy and the demographic factors. Descriptive survey research is one of the most popular research designs in education because it allows analysis of existing practice and conversely can inform evidence-based interventions. (Fraenkel, Wallen, & Hyun, 2012).

Population and Sample

The study population consisted of all teachers working in public-sector secondary schools in District

Peshawar, Khyber Pakhtunkhwa. These teachers were selected because they play a vital role in ICT integration at the secondary level, where the curriculum becomes more complex. A sample of 200 teachers was selected using a simple random sampling technique to minimize bias and ensure representativeness (Gay, Mills, & Airasian, 2012). Both urban and rural teachers were included to capture a holistic view of digital literacy across different contexts.

Instrumentation

Data were collected using a structured questionnaire adapted from validated digital literacy frameworks, including the European Commission's DigCompEdu framework and instruments previously used in South Asian contexts (Redecker, 2017; Siddiq, Hatlevik, & Throndsen, 2016). The questionnaire comprised five sections: (1) demographic information (gender, age, teaching experience, school type, and location); (2) digital access and ICT usage patterns; (3) self-reported digital literacy competencies (e.g., information handling, communication, content creation, safety, and problem-solving); (4) challenges to ICT integration; and (5) professional development and training needs.

Data Collection Procedure

Data collection was carried out over four weeks through scheduled school visits. Official permission was obtained from the District Education Office, and informed consent was taken from participants. Each teacher received a questionnaire with a clear explanation of the study's purpose and voluntary nature. To ensure ethical compliance and confidentiality, no personal identifiers were collected, and participants were assured their responses would be used only for academic purposes. Completed questionnaires were collected on the same day to maximize response rates and prevent data loss.

Data Analysis

Collected data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Analysis was conducted in two phases. First, descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize demographic information, ICT access, usage patterns, and self-assessed digital literacy levels. Second, inferential analyses were employed to explore the relationship between demographic variables and teachers' digital literacy competencies.

Results and Analysis

Section A: Demographic Information

Item	Category	Frequency (F)	Percentage (%)
1. Gender	Male	88	58.7%
	Female	62	41.3%
	Other	0	0.0%
2. Age	Below 30	38	25.3%
	31–40	54	36.0%
	41–50	40	26.7%
	Above 50	18	12.0%
3. Teaching Experience	Less than 5 years	32	21.3%
	5–10 years	44	29.3%
	11–15 years	39	26.0%
	More than 15 years	35	23.3%
4. School Location	Urban	90	60.0%
	Rural	60	40.0%
5. School Type	Government	98	65.3%
	Private	52	34.7%
6. Subjects Taught	English	38	25.3%
	Science	35	23.3%
	Mathematics	30	20.0%

	Computer/ICT	22	14.7%
	Others (e.g., Urdu, Isl.)	25	16.7%
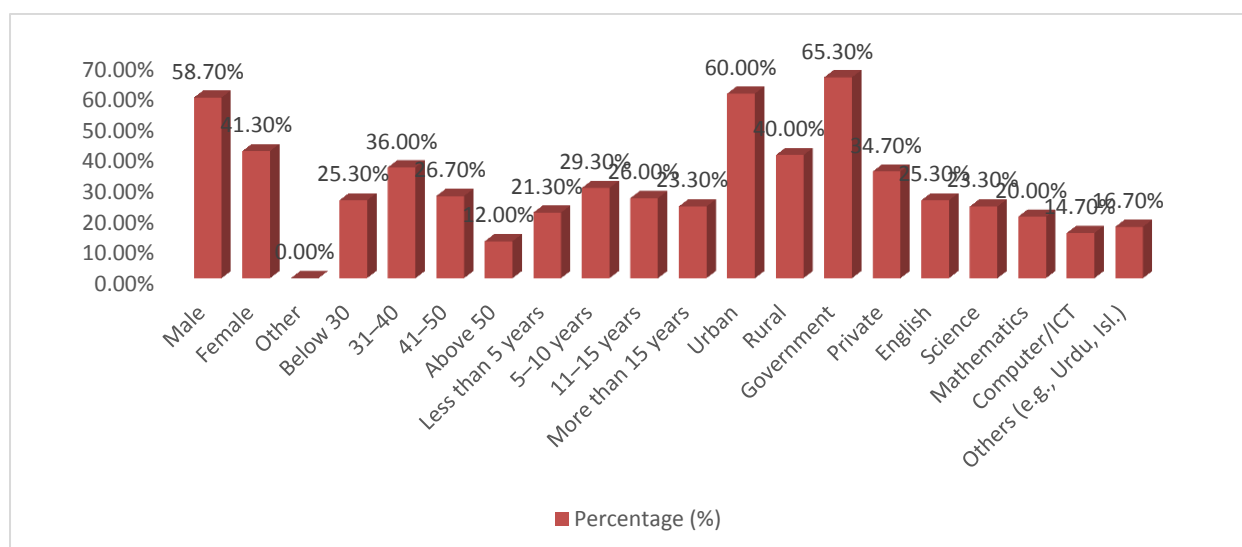
Section B: ICT Access and Usage

ICT Tool	Daily F (%)	Weekly F (%)	Monthly F (%)	Rarely F (%)	Never F (%)
7. Desktop/Laptop at school	42 (28.0%)	38 (25.3%)	22 (14.7%)	26 (17.3%)	22 (14.7%)
8. Smartphone for teaching purposes	60 (40.0%)	34 (22.7%)	20 (13.3%)	18 (12.0%)	18 (12.0%)
9. Internet access at school	45 (30.0%)	36 (24.0%)	25 (16.7%)	22 (14.7%)	22 (14.7%)
10. Multimedia/projector in classroom	30 (20.0%)	32 (21.3%)	28 (18.7%)	30 (20.0%)	30 (20.0%)
11. Educational software (e.g., apps)	25 (16.7%)	30 (20.0%)	32 (21.3%)	34 (22.7%)	29 (19.3%)
12. Learning Management Systems (LMS)	20 (13.3%)	28 (18.7%)	24 (16.0%)	38 (25.3%)	40 (26.7%)

The findings on ICT access and usage revealed mixed patterns among secondary school teachers in District Peshawar. A little over half of the teachers (53.3%) reported using desktops or laptops daily or weekly, though 32% indicated rare or no access, highlighting disparities in hardware availability across schools. Smartphones emerged as the most frequently used digital tool, with 62.7% of teachers using them regularly for teaching, while only 12% reported never using them, suggesting their practicality due to personal ownership and portability. Internet access was reported by 54% of teachers on a daily or weekly basis, yet 29.4% had rare or no access, reflecting persistent connectivity challenges. Multimedia tools such as projectors were used regularly by 41.3% of teachers, but 40% reported minimal or no use, indicating uneven integration despite their pedagogical benefits. Similarly, only 36.7% of teachers reported frequent use of educational software, while 42% rarely or never used it, likely due to limited training, awareness, or infrastructure. Learning Management Systems (LMS) had the lowest adoption, with only 32% using them at least monthly and over half (52%) reporting rare or no use, suggesting that LMS integration remains at an early stage, hindered by lack of institutional support and technical

expertise.

Section C: Digital Literacy Competencies

Digital Skill	Not Competent	Slightly Competent	Moderately Competent	Competent	Highly Competent
	F (%)	F (%)	F (%)	F (%)	F (%)
13. Use MS Word, PowerPoint, Excel	8 (5.3%)	12 (8.0%)	30 (20.0%)	60 (40.0%)	40 (26.7%)
14. Conduct an internet search for teaching content	5 (3.3%)	10 (6.7%)	28 (18.7%)	65 (43.3%)	42 (28.0%)
15. Create and use digital teaching aids (slides, videos)	10 (6.7%)	15 (10.0%)	35 (23.3%)	58 (38.7%)	32 (21.3%)
16. Use email or messaging apps for professional communication	4 (2.7%)	8 (5.3%)	25 (16.7%)	68 (45.3%)	45 (30.0%)
17. Access and use online educational platforms	12 (8.0%)	18 (12.0%)	40 (26.7%)	50 (33.3%)	30 (20.0%)
18. Evaluate online resources for credibility and relevance	15 (10.0%)	20 (13.3%)	38 (25.3%)	48 (32.0%)	29 (19.3%)
19. Use tech to differentiate instruction for diverse learners	18 (12.0%)	22 (14.7%)	42 (28.0%)	45 (30.0%)	23 (15.3%)
20. Ensure online safety and digital ethics in teaching	10 (6.7%)	17 (11.3%)	36 (24.0%)	55 (36.7%)	32 (21.3%)

The findings revealed that a strong majority of teachers (66.7%) rated themselves as competent or highly competent in basic productivity tools such as Microsoft Word, PowerPoint, and Excel. This suggests that foundational digital skills are well-established among most educators. Nevertheless, 13.3% of respondents acknowledged being either not competent or only slightly competent, highlighting the need for targeted support for this subset of teachers.

Similarly, a very high proportion (71.3%) reported competence or high competence in searching for online teaching materials, indicating that internet navigation for instructional resources is a widely developed skill. Only 10% expressed low competence in this area, suggesting growing familiarity and confidence in sourcing digital content.

In terms of digital content creation (e.g., slides, videos), about 60% of teachers considered themselves competent or highly competent. However, 23.3% reported only moderate competence and 16.7% indicated low competence. This highlights a skill-enhancement gap in the area of digital content development.

Digital communication skills appeared to be among the strongest, with 75.3% of teachers expressing confidence in using tools such as email and messaging applications for professional purposes. This widespread comfort likely reflects the increased digital engagement necessitated by recent educational shifts.

However, only just over half (53.3%) rated themselves as competent or highly competent in using online educational platforms. A significant minority (20%) still felt slightly or not competent, indicating that while many are comfortable, there remain challenges for a notable portion of teachers. Similarly, the confidence to judge the credibility and relevance of online resources was only 51.3% with 23.3% reporting low competence. This underscores a gap in critical digital literacy skills, in which teachers, who are using digital resources actively, are lacking strong evaluative skills.

The least good competence areas were the use of technology to cater for students with a variety of needs. Results: One-fourth of the respondents (n=453; 24.6%) were considered to be moderately competent, one-third (n=453; 33%) were considered to be slightly or not competent, and only 45.3% of the respondents were considered to be competent or highly competent. This highlights a significant digital divide and the capacity to tailor the use of technology in order to meet different learning needs.

Finally, in terms of digital ethics and safety, only 58% were competent, 24% only moderately competent, and 18% low competent. This draws attention to a significant training need in regards to topics like online privacy, cyberbullying prevention and ethical technology use.

Section D: Barriers and Challenges

Challenge	Not at All	Slightly	Moderately	To a Great Extent	Very Great Extent
	F (%)	F (%)	F (%)	F (%)	F (%)
21. Lack of computers/infrastructure in school	5 (3.3%)	10 (6.7%)	22 (14.7%)	55 (36.7%)	58 (38.7%)
22. Unreliable internet connection	6 (4.0%)	12 (8.0%)	30 (20.0%)	50 (33.3%)	52 (34.7%)
23. Insufficient ICT training opportunities	8 (5.3%)	14 (9.3%)	28 (18.7%)	56 (37.3%)	44 (29.3%)
24. Lack of time due to teaching workload	12 (8.0%)	16 (10.7%)	35 (23.3%)	50 (33.3%)	37 (24.7%)
25. Lack of administrative/leadership support	15 (10.0%)	18 (12.0%)	34 (22.7%)	48 (32.0%)	35 (23.3%)
26. Negative attitude or fear of using technology	20 (13.3%)	22 (14.7%)	40 (26.7%)	42 (28.0%)	26 (17.3%)
27. Irrelevant training content not aligned with classroom needs	18 (12.0%)	19 (12.7%)	38 (25.3%)	44 (29.3%)	31 (20.7%)

The research determined that there are a number of structural and institutional hindrances to ICT integration in schools. When it comes to the ICT infrastructure and facilities, the majority of respondents (75.4%) found that the absence of computers and supporting infrastructure created a significant or very significant challenge, highlighting a serious digital divide between schools. Ten per cent of teachers gave the lowest consideration to this issue which shows that there is an urgent need to invest in basic technological resources. poor internet connection was cited as a significant constraint - 68% of teachers said this was a major challenge. This shows that even where the devices are, there remain connectivity problems that still prevent effective use of ICT for teaching and learning purposes.

Capacity building was identified as a further urgent issue. Two-thirds of teachers (66.6%) felt there was a significant challenge to the availability of professional training opportunities, compared to 14.6% who felt the opportunity to train is a somewhat minor challenge for them. This is consistent with the previously mentioned need from teachers to get more practical, classroom-based ICT training, emphasising the need for relevant and accessible professional development programs.

In addition, workload-related constraints were found. More than half of the respondents (58%) indicated that high teaching loads restricted their ability to adopt or experiment with digital tools, suggesting that considerations of time allocation and workloads must be made in ICT initiatives.

Leadership support was found to be quite variable between schools. Results: The findings indicated that among the teachers, 55.3% perceived lack of encouragement and provision of resourcing by school

leaders as a very big challenge, 22% did not take it as a major challenge, implying there are differences in institutional mechanisms of support of ICT integration.

Psychological factors, such as fear of technology or lack of confidence were comparatively smaller. Only 45.3% considered them to be a major challenge and 28% considered them as negligible. This indicates that such barriers might be slowly decreasing as exposure to and familiarity with digital is increased.

Finally, one striking finding was about the relevance of training. About half of the teachers (50%) said that the current content of training was not adequately linked to the reality of teaching in the classroom and the curricular needs, and nearly a quarter (24.7%) said it had little importance. This highlights the need for capacity building of training designers to interact with teachers and contextualize ICT training from the perspective of practical classroom experiences.

Section E: Training and Professional Development Needs

Statement	SDAG	DAG	NT	AG	SAG
	F (%)	F (%)	F (%)	F (%)	F (%)
28. I need more training on using digital tools for teaching.	5 (3.3%)	8 (5.3%)	18 (12.0%)	60 (40.0%)	59 (39.3%)
29. Training should include practical, classroom-based strategies.	4 (2.7%)	6 (4.0%)	20 (13.3%)	58 (38.7%)	62 (41.3%)
30. I am willing to attend digital skills training if made available.	2 (1.3%)	5 (3.3%)	15 (10.0%)	58 (38.7%)	70 (46.7%)
31. Online or hybrid training programs would be more convenient.	6 (4.0%)	10 (6.7%)	25 (16.7%)	55 (36.7%)	54 (36.0%)
32. Continuous professional development is essential for keeping up with trends.	3 (2.0%)	4 (2.7%)	18 (12.0%)	60 (40.0%)	65 (43.3%)

The results of the survey show a clear and consistent need from teachers for better digital training and professional development. A large percentage of responders (79.3%) agreed or strongly agreed that there is a need to improve training in the digital tools, indicating a general awareness of the needs for improvement in their current level of skills. This implies that, although 8.6% of teachers were opposed to this statement and 12% were neutral, the overwhelming majority of teachers agree that capacity-building programs are needed in digital pedagogy. Likewise, 80% of teachers wanted to have real-world, classroom-based training as opposed to a theoretical approach. This indicates that teachers are open to hands-on approaches that specifically address real-time classroom issues (with only 6.7% in disagreement and 13.3% taking the neutral position).

There is also evidence of teacher motivation to advance professional development as 85.4% expressed their willingness to attend a digital skills training. The overall high interest and, in particular, the rather low level of disinterest (4.6%) provides a promising basis for a successful realization and scaling-up of capacity-building programs. In addition, more than three-quarters (72.7%) of teachers were in favor of online or hybrid training models, indicating an increasing acceptance of flexible learning models. However, a small proportion (10.7%) disagreed and an even smaller proportion (16.7%) were neutral suggesting that there are concerns or limitations related to online learning that require to be managed using blended models and other support systems. Importantly, respondents agreed in very large numbers (83.3%) that ongoing professional development is necessary to keep up with changing educational and technological needs, and very few disagreed (4.7%).

Taken together, these results suggest that there is strong teacher agreement on the need for digital training, a willingness to actively participate in professional development and a preference for practical

and flexible training formats. The results underline the importance of systematic, accessible and contextualized professional development opportunities that focus not only on digital competence, but also on continuous professional development in response to the fast-paced nature of change in education.

Discussion

The research findings present a complex, but positive picture of digital literacy in secondary school teachers of District Peshawar. Although there is a group of educators with good understanding of the basics of digital skills and the willingness to contribute to the field of their profession, there are still several barriers that may disrupt the process of implementing ICT in classroom training. Among the most remarkable findings, there is the extensive use of smartphones when it comes to education. More than 60 percent of the respondents either used smartphones to teach daily or weekly, which demonstrates their availability and usefulness in the context of low-resource areas. This correlates with the findings by Gul et al. (2022) who had observed that in most developing regions, mobiles are a staple digital tool as they are affordable and have portability. Nonetheless, there is still no uniform access to more formal infrastructure including desktop computers, projectors, and Learning Management Systems (LMS). A considerable number of those teaching stated to use these tools not very frequently or not at all where national level evaluation indicates inadequate ICT facilities to be an impediment in Pakistani government schools (Ahmed & Mahmood, 2020).

Regarding digital skills, most of the teachers expressed their competencies in the use of Microsoft Office software, internet research, and digital communication systems. This gives a positive starting point of digital literacy. Yet the more sophisticated skills, e.g. to create interactive digital contents, appraise online resources in terms of their quality and credibility, and differentiated instruction facilitated by use of ICT, were less achieved. Based on Saeed et al. (2021), although Pakistani teachers commonly possess the basic skills of operation of technology, they do not have the pedagogical perspective and integration of technology to be functional in the 21st century teaching. Correspondingly, the low level of confidence in the online education platforms utilization and digital safety only confirms the still superficial approach to digital literacy and its practice in instruction in teachers.

It was possible to identify barriers to ICT integration. Inadequate internet connections, inadequate ICT tools and pitiful administrative support were cited by most of the respondents. This aligns with the findings by Zayapragassarazan (2020) that effective ICT integration requires not only teacher individual skills, but also institutional rules, which support the effective implementation. Also, quite a number of teachers complained of lack of relevance and practicality of the current training programs available, a point that concurs with Khan et al. (2020) article that discusses the lack of contextualization of professional development in Pakistan.

Although teachers had to face some of these obstacles, one of the most encouraging results of the research was the readiness to continue ICT training among the teaching personnel. A huge majority also consider being interested in participating in programs of professional development, but among them, there is a desire to participate in practical, classroom-based programs, and the format should have flexibility and be online or hybrid. This preparation is extremely important because UNESCO (2021) has underlined that teacher buy-in and motivation are the key to effective digital transformation in education. One point that teachers also expressed with great enthusiasm was on the need to continually train, implying that through the right guidance, they will be willing to change according to the emerging technological trends.

The data as a whole indicate that although integration of ICT faces considerable structure and pedagogical issues, a substantial amount of digital engagement and motivation exists in teachers. These challenges can be addressed with the help of proper interventions, including provision of better school building structures, creation of localized training to suit local contexts, and better administrative support, which can narrow the gap between digital preparedness and successful implementation in classrooms.

Conclusion

The results obtained in the present research give a comprehensive picture of the present situation of digital literacy of the teachers of secondary schools working in the District of Peshawar. As it can be seen, although most teachers already have basic skills of working with digital devices including using Microsoft Office, online searching, and communicating with the help of applications, there is still a significant lack in the number of more advanced skills that include operating educational platforms, analyzing internet content, and facilitating the needs of the diverse learners through the integration of technology. Other issues that magnify these problems are infrastructural, e.g. access to computers, projectors, internet connectivity and there is limited access to all these in the classrooms, which means that even when there is an opportunity to use technology in the classroom, there is a lack of those resources.

Furthermore, although various teachers are preoccupied and do not get much assistance on their part in the context of the school administration, they have surprisingly been very enthusiastic towards the digital education. Most respondents indicated that they were quite eager to partake in professional development opportunities and willing to do them when they are developed in such a way that makes them practical, classroom-directed, and (critically) available in forms of online or hybrid offerings. This is a promising degree of motivation and readiness to change. The validity, continuity and correlation of training programs to the specific teaching needs is essential in order to have effective training programs. With strategic funding and institutional support, it is possible to have teachers as effective agents of digital change in education.

To sum up, even though obstacles to ICT integration are still massive, the willingness of educators to accept the popularity of digital technologies can be viewed as an ideal chance towards reform in education. These structural and pedagogical issues can be overcome by considering informed policies and intensive interventions by the stakeholders to strengthen the digital literacy and escalate the quality of teaching and learning at the district level.

Recommendations

Based on the study findings, the following recommendations are proposed:

1. Make sure every school has sufficient digital technology facilities including but not limited to computers, proper internet connection, updated educational software and use of projectors.
2. Engage in design of hands-on, classroom-based and context-specific professional development programs that are oriented to the real needs of teachers.
3. Put in place a mechanism of continuous education and training in digital literacy by implementing a mechanism of refresher courses and other follow up trainings.
4. Provide training in hybrid or online format so that the trainer could be in line with the time and preferences of teachers.
5. School heads should be encouraged to adopt the friendly culture in the adoption of ICT by giving time, resources, and incentives to the tech-savvy projects.

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