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EMPOWERING EDUCATORS: DIGITAL LITERACY, ICT SELF-EFFICACY, AND FUNCTIONAL SKILLS IN PAKISTANI SCHOOLS

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Abstract

Keywords:

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Digital literacy refers to the ability to effectively and critically use digital technologies for various tasks, including communication, information retrieval, and content creation. ICT self-efficacy refers to an individual's confidence in using these technologies optimally. Both factors influence functional skills, such as literacy, numeracy, and communication, and enhance the use of technology in daily life. This study examines the impact of digital literacy and ICT self-efficacy on the functional skills of Islamic secondary school teachers in Kot Addu South, Pakistan. Using a quantitative approach, a survey was conducted on 996 science teachers. Data were analyzed based on the respondents' demographics in percentages, with validity and reliability tested through expert opinions and Cronbach's Alpha scores. The results indicate a positive correlation between digital literacy, ICT self-efficacy, and improved problem-solving and critical thinking skills. This conclusion is relevant for educators and policymakers in improving education in rural areas.

INTRODUCTION

In the 21st century, digital literacy has become an essential skill for students and educators alike, shaping the way individuals engage with information, solve problems, and communicate. As information and communication technologies (ICT) become more integrated into educational systems globally, the role of digital literacy and ICT self-efficacy in enhancing functional skills has gained significant attention. Digital literacy refers to the ability to use digital tools and technologies effectively, while ICT self-efficacy involves the confidence in one's ability to use such tools competently (Bandura, 1997). Functional skills, which include problem-solving, critical thinking, and communication, are vital for students' academic success and preparation for future careers (OECD, 2018).

The integration of Information and Communication Technology (ICT) in education has been recognized globally as a critical factor in improving teaching and learning outcomes. As the digital world increasingly influences all aspects of life, digital literacy has emerged as a core competency for students, alongside traditional academic skills. Digital literacy refers to the ability to access, manage, evaluate, and create information using digital technologies (Eshet-Alkalai, 2004). In education, this competency is linked not only to students' academic success but also to the development of functional skills such as problem-solving, critical thinking, and communication, which are essential for navigating modern work environments (OECD, 2018).

ICT self-efficacy, defined as the belief in one's ability to effectively use digital tools and technologies, plays a critical role in students' learning experiences and outcomes. Bandura's (1997) social cognitive theory suggests that self-efficacy influences motivation, behavior, and performance, which can also extend to technology-related tasks. Research by Compeau and Higgins (1995) demonstrated that individuals with higher ICT self-efficacy are more likely to engage in and successfully use technology, leading to better academic and functional skills outcomes. In educational settings, ICT self-efficacy has been shown to significantly affect students' engagement, persistence, and achievement in technology-enhanced learning environments (Tondeur, et al., 2017).

Digital literacy is increasingly recognized as a fundamental skill for educators in the 21st century. It goes beyond the mere ability to use digital tools, encompassing a comprehensive understanding of how to apply these tools effectively in teaching and learning contexts (Ferrari, 2013). In this regard, digital literacy is critical not only for enhancing instructional practices but also for preparing students to thrive in a digital society (Buckingham, 2015). As the global educational landscape shifts towards more technology-integrated approaches, the role of teachers in fostering

digital literacy becomes more crucial. Teachers are expected to guide students in navigating digital environments, assessing digital content critically, and creating digital artifacts.

Research suggests that when teachers are proficient in digital literacy, they can facilitate more engaging, interactive, and personalized learning experiences (Kivunja, 2014). However, a significant challenge remains in ensuring that teachers, especially in developing countries, are adequately prepared for these demands. For instance, a study by Koehler and Mishra (2009) highlights the necessity of integrating technological knowledge with pedagogical and content knowledge (TPACK) to create effective teaching practices in the digital age.

Teacher preparation programs play a pivotal role in equipping future educators with the skills needed for the digital age. The integration of digital literacy into these programs has been advocated as essential for building a workforce of teachers who are competent in using digital technologies to enhance learning (Mishra & Koehler, 2006). According to Sang, et al. (2010), pre-service teacher training that includes digital literacy components significantly influences teachers' confidence and competence in using technology in their future classrooms.

However, the implementation of digital literacy in teacher education is not without challenges. Many programs, particularly in developing regions, struggle with insufficient resources, inadequate infrastructure, and a lack of qualified trainers (Tondeur, et al., 2017). Furthermore, there is often a mismatch between the digital skills taught in teacher preparation programs and the actual technological demands in classrooms (Voogt & McKenney, 2017). This gap is particularly pronounced in rural areas, such as District Kot Addu, where access to digital tools and training is limited.

Gender disparities in access to and use of digital technologies are well-documented, with women often facing more significant barriers than men (Hafkin & Huyer, 2008). In educational settings, female teachers frequently report lower levels of digital literacy compared to their male counterparts, which can be attributed to various factors including societal norms, limited access to technology, and fewer opportunities for professional development (UNESCO, 2018).

In Pakistan, the integration of ICT in education has been slow, particularly in rural areas like Kot Addu South. While there have been efforts to improve ICT infrastructure in schools, many teachers still face challenges in utilizing digital tools effectively due to limited resources, training, and support (Khan, 2017). This is a significant issue, as teachers' use of digital tools directly influences students' learning outcomes, including the development of functional skills. Furthermore, the role of students' digital literacy and self-efficacy in their academic performance is crucial, as those with higher digital skills are more likely to perform better in tasks that require technology use (Gajendran & Srisaran, 2019).

This study aims to investigate the current level of digital tool usage among teachers in Islamic secondary schools in Kot Addu South, Pakistan, and assess the relationship between digital literacy, ICT self-efficacy, and functional skills development among students. This study also would like to analyze of teacher's digital literacy and ICT self -efficacy on functional skills comparatively analyze based on gender. By doing so, it seeks to provide insights into how enhancing ICT capabilities can improve students' functional skills in these schools. The 21st century has witnessed unprecedented advancements in digital technology, fundamentally transforming various sectors, including education. As schools increasingly integrate technology into teaching and learning, the need for educators proficient in digital literacy has become critical. Digital literacy, defined as the ability to effectively use digital tools and resources, is no longer a supplementary skill but a core competency for teachers (Ferrari, 2013). It enables educators to enhance instructional practices, engage students more effectively, and prepare them for a rapidly evolving digital world.

This study is significant as it highlights the role of digital literacy and ICT self-efficacy in enhancing functional skills among students in rural Islamic secondary schools in Kot Addu South, Pakistan. By investigating teachers' use of digital tools and students' ICT skills, the study provides valuable insights for policymakers and educators to improve ICT integration in education. The findings could guide future educational reforms, support teacher training, and contribute to improving students' academic and practical skills, thereby fostering better academic outcomes and career preparedness in undeserved regions.

METHODS

The study was conducted in the district of Kot Addu, located in the southern part of Punjab Province, Pakistan. This region is predominantly inhabited by economically disadvantaged and underdeveloped communities, many of whom rely on daily wage labor for their livelihood. Educational institutions in the area operate under governmental policies aligned with the constitutional mandate of free and compulsory education, as enshrined in Article 25-A of the Constitution of Pakistan, 1973. Additionally, the district is home to a class of landowners who hold significant socio-economic influence over the local population, further shaping the region's socio-economic dynamics.

This study utilized a quantitative research method exploring the impact of digital literacy and ICT self-efficacy on functional skills development among teachers at Islamic Secondary Schools in Kot Addu South, Pakistan. Data were collected through a structured survey administered to a

sample of secondary school teachers in District Kot Addu, South Pakistan. The survey included questions on teachers' knowledge and proficiency with digital literacy tools, their participation in digital literacy training programs, and their attitudes toward technology use in education.

The survey was distributed to a randomly selected sample of 150 teachers, and a total of 120 completed responses were analyzed. Statistical techniques, including descriptive statistics and inferential analysis, were used to examine the data and identify patterns and correlations. The analysis focused on evaluating the effectiveness of digital literacy training programs and comparing digital literacy levels between male and female teachers.

Ethical considerations were addressed by ensuring informed consent, maintaining participant confidentiality, and using the data solely for research purposes. The results provided quantitative insights into the current state of digital literacy among teachers and the impact of training programs on their professional development.

RESULTS AND DISCUSSION

ICT in Education and Its Impact on Functional Skills

The integration of ICT in education has transformed traditional teaching methods and enhanced students' ability to perform tasks in a digital world. Studies have consistently shown that digital tools can improve students' problem-solving skills, creativity, and analytical thinking (Voogt, et al., 2015). The use of ICT facilitates interactive learning experiences and access to a wide array of resources, which can deepen understanding and promote critical thinking (Harris, 2018). Functional skills, which are necessary for academic success and later career development, are increasingly seen as skills that can be cultivated through technology-enhanced education (Graham, 2017). These skills include problem-solving, communication, and collaboration, all of which are essential in today's technology-driven workplace.

Teachers are a fundamental factor in determining the success of ICT integration into the classroom. Studies have shown that the more teachers use digital tools in their teaching practices, the greater the impact on students' digital literacy and functional skills (Tondeur, et al., 2017). However, despite the potential benefits, many teachers, particularly in developing countries, face challenges in incorporating ICT effectively due to a lack of resources, training, and support. In rural regions like Kot Addu South, Pakistan, these barriers are particularly pronounced, where access to technology is limited and teachers often lack the necessary skills or confidence to use ICT tools in the classroom (Khan, 2017). As such, teachers' digital literacy and ICT self-efficacy directly impact their ability to

create an engaging and technology-rich learning environment for students.

In a study conducted by Becta (2004), it was found that teachers who are confident in their ICT skills and have access to adequate resources are more likely to incorporate technology into their teaching. On the other hand, teachers who lack digital skills or face infrastructure limitations tend to avoid using technology, which can hinder students' exposure to digital tools. A study by Hussain, et al. (2013) on Pakistani teachers found that many teachers in rural areas are hesitant to integrate ICT into their teaching due to insufficient training, limited access to technological resources, and a lack of institutional support. This creates a significant gap in digital literacy, both for teachers and students.

In Pakistan, the integration of ICT in education faces several challenges, particularly in rural areas. The digital divide is a significant issue, with students in rural regions having limited access to computers and the internet (Shah, 2017). Additionally, the availability of technological infrastructure is uneven, with urban areas often receiving more attention and resources compared to rural areas (Khan, 2017). This unequal distribution of resources creates a significant barrier to students' development of digital literacy and functional skills.

The limited access to ICT in rural schools in Pakistan has been linked to lower levels of digital literacy among students, affecting their preparedness for modern academic and professional challenges. A study by Sadaf, et al. (2012) found that even when technology was available, teachers often lacked the training and motivation to use it effectively, leading to underutilization of digital tools in the classroom. This lack of effective integration in rural schools results in missed opportunities for students to develop vital digital skills that are increasingly necessary in the global workforce.

Research has indicated a strong relationship between digital literacy, ICT self-efficacy, and the development of functional skills. Digital literacy skills, such as the ability to navigate the internet, use software applications, and communicate online, are closely tied to the development of critical functional skills like problem-solving, communication, and analytical thinking (Voogt, et al., 2015). Moreover, students who feel confident in their ability to use technology (high ICT self-efficacy) are more likely to engage in complex tasks that require digital tools, which in turn enhances their functional skills (Gajendran & Srisaran, 2019).

In Pakistan, the relationship between these variables has been less studied, especially in rural contexts. However, studies from similar regions have shown that increasing digital literacy and ICT self-efficacy among students can significantly improve their academic performance and functional skills (Hussain, et al., 2013). Students in schools with higher levels of digital literacy tend to perform better in tasks requiring technology use, and they also report higher self-efficacy regarding their

ability to use ICT for academic purposes (Sadaf, et al., 2012). This suggests that enhancing students' digital skills and their confidence in using technology can lead to improved problem-solving and critical thinking skills.

Digital Tool Usage Among Teachers in Pakistan

The integration of digital tools in education has become a pivotal factor in modern teaching practices. Digital tools, ranging from learning management systems (LMS) to multimedia resources and social media platforms, offer teachers new ways to enhance instruction, facilitate communication, and manage their classrooms (Lai & Hong, 2015). However, the extent and effectiveness of digital tool usage vary greatly across teachers and institutions, influenced by factors such as technological proficiency, access to resources, and professional development opportunities.

Research highlights that teachers' digital tool usage is often shaped by their **ICT self-efficacy**—their confidence in using technology effectively (Keller, 2016). Teachers with higher ICT self-efficacy are more likely to incorporate a variety of digital tools into their teaching, as they feel more capable of overcoming technological challenges (Compeau & Higgins, 1995). Conversely, those with lower ICT self-efficacy may be hesitant to adopt digital tools, leading to limited integration in the classroom (Mumtaz, 2000).

Professional development plays a crucial role in fostering teachers' ability to effectively use digital tools. Studies show that teachers who engage in continuous training and receive support in technology integration are better equipped to utilize digital tools for instruction (Ertmer & Ottenbreit-Leftwich, 2010). Moreover, teachers' attitudes towards technology also influence tool usage. Positive attitudes often stem from seeing the direct benefits of digital tools in improving student engagement, facilitating collaborative learning, and streamlining administrative tasks (Teo, 2011).

Despite the potential benefits, several barriers hinder the widespread adoption of digital tools among teachers. These barriers include inadequate access to technology, limited time for lesson planning and tool integration, and insufficient technical support (Koh & Lim, 2009). Additionally, the digital divide between urban and rural schools often results in unequal opportunities for teachers to access and use digital tools effectively (Becta, 2004).

The effective use of digital tools in education has been shown to enhance student learning outcomes, particularly in fostering critical thinking, collaboration, and engagement. For example, interactive digital tools like educational apps and online collaboration platforms enable students to take a more active role in their learning process (Ng, 2012). Teachers who incorporate these tools

into their teaching strategies report higher levels of student participation and achievement (Johnson, et al., 2016).

The researchers conducted a study by comparing the level of digital tool usage among teachers in four Islamic secondary schools, with the following data obtained:

Table 1. Current level of digital tool usage among teachers in Islamic secondary schools.

	Kot addu	Ali Noor	Chobara	Chowk Khan
Male	13.62%	15.18%	12.09%	12.44%
Female	7.32%	8.65%	10.76%	20.97%
Total	20.94%	25.83%	20.84%	31.39%

It shows that male teachers in Kott Addu Tehsil did 13.62% of the work and female teachers did 7.32%, for a total of 20.94%. In Ali Noor Tehsil, male teachers did 15.18% of the work and female teachers did 8.65%, for a total of 25.83%. In Tehsil Chobara, male teachers did 12.09% of the work and female teachers did 10.76%, for a total of 20.84%. In the same way, male teachers in Tehsil Chowk Khan did 12.44 percent of the work, while female teachers did 20.9 percent. Together, they did 31.3 percent. Based on the information gathered, female teachers in Tehsil Chowk Khan did better than male teachers by 20.97%, which is higher than the 12.09% difference in Tehsil chobara. This means that the female teachers in Tehsil Chowk Khan did better with the digital literacy courses than the male teachers in Tehsil Ali Noor.

Table 2. Relationship between digital literacy skills, ICT self-efficacy, and functional skills development

	Kot addu	Ali Noor	Chobara	Chowk Khan
Male	15.44%	15.13%	11.59%	12.42%
Female	9.30%	10.96%	12.00%	23.95%
Total	24.74%	26.07%	23.59%	36.37%

The results show that male teachers in Kott Addu Tehsil did 15.44% of the work and female teachers did 9.30%. Together, they did 24.74%. In Ali Noor Tehsil, male teachers did 15.13% of the work and female teachers did 10.96%. Together, they did 26.07%. In Tehsil Chobara, male teachers did 11.59% of the work and female teachers did 12.00%. Together, they did 23.59%. Similarly, in

Tehsil Chowk Khan, male teachers did 12.42% of the work and female teachers did 23.95%. Together, they did 36.37%. Based on the information gathered, female teachers in Tehsil Chowk Khan did better than male teachers by 23.95%, compared to 11.59% in Tehsil Chobara. Teachers in Tehsil Chowk Khan who were women did better than teachers in Tehsil Chobara who were men in this area of digital knowledge.

Table 3. Analysis of teacher's digital literacy and ICT self-efficacy on functional skills comparatively analyze based on gender.

<i>Sr no.</i>	<i>Tehsil</i>	<i>Performance by percentage</i>
1.	<i>Chowk Khan</i>	34.4%
2.	<i>Ali Noor</i>	22.72%
3.	<i>Chobara</i>	26.00% ³
4.	<i>Kot Addu</i>	21.08%

One of the four tehsils that were looked at as a whole had teachers do 34.4% better than expected. In tehsil Ali noor, teachers did 22.72% better, in Tehsil Chobara, teachers did 26.00% better, and in tehsil kit Addu, teachers did 21.08% worse. Because teachers in tehsil kit Addu didn't do as well as teachers in other tehsils in the district of Kot Addu, this tehsil needs to learn how to use technology properly.

This study highlights the critical role of digital literacy and ICT self-efficacy in enhancing functional skills among teachers in Islamic secondary schools in Kot Addu South, Pakistan. Findings indicate that while digital tool usage among teachers is moderate, there is a noticeable gap in the effective integration of ICT due to limited resources and insufficient teacher training. This lack of ICT proficiency impacts students' development of essential skills like problem-solving and critical thinking. The positive correlation between teacher's digital literacy and ICT self-efficacy supports the idea that increasing both can significantly improve teachers' functional skills.

These findings align with existing research, which shows that greater digital literacy and confidence in ICT use lead to enhanced academic performance and skill development (Tondeur, et al., 2017; Sadaf, et al., 2012). However, the challenges in rural areas, such as inadequate infrastructure and training, hinder the full potential of ICT integration, limiting students' opportunities to develop these skills. To address these issues, the study suggests that improving teacher training and providing better technological resources could help foster a more effective ICT learning environment, leading

to better functional skills development among students. This discussion emphasizes the importance of ICT self-efficacy and digital literacy in educational outcomes, particularly in rural settings, where access to technology is often limited.

The study found that while digital tool usage among teachers in Islamic secondary schools in Kot Addu South is moderate, there is a significant gap in the effective integration of ICT due to limited resources and lack of training. A positive correlation was observed between teachers' digital literacy and ICT self-efficacy, indicating that students with higher digital skills and confidence performed better in developing functional skills such as problem-solving and critical thinking. However, challenges like inadequate infrastructure and teacher preparedness hinder the full potential of ICT to enhance students' functional skills in rural areas.

The findings from the data analysis reveal notable differences in digital tool usage and ICT self-efficacy among teachers across the four tehsils. Male teachers generally outperformed female teachers in digital tool usage, except in Tehsil Chowk Khan, where female teachers performed better than their male counterparts. Tehsil Chowk Khan had the highest overall performance in both digital tool usage and ICT self-efficacy, with a total of 36.37%, driven by strong performance from female teachers. On the other hand, Tehsil Kot Addu showed the lowest performance in both digital tool usage and functional skills development, scoring only 21.08%. Additionally, a gender gap in ICT self-efficacy was observed, with male teachers generally demonstrating higher self-efficacy than female teachers, though this gap was narrower in Tehsil Chowk Khan. These findings highlight the need for targeted interventions to improve digital literacy, particularly in Tehsil Kot Addu, and to address gender disparities across the district.

CONCLUSION

In conclusion, this study underscores the importance of digital literacy and ICT self-efficacy in enhancing functional skills among teachers in Islamic secondary schools in Kot Addu South, Pakistan. The findings suggest that while there is potential for ICT to improve academic outcomes, challenges such as limited resources and teacher training need to be addressed. To maximize the benefits of ICT, it is crucial to invest in teacher development, improve infrastructure, and foster a supportive environment for both teachers and students. These efforts can significantly enhance students' functional skills and prepare them for future success.

The data analysis reveals notable differences in the use of digital tools and ICT self-efficacy among teachers across the tehsils of District Muzaffargarh. Female teachers in Tehsil Chowk Khan

performed better than their male counterparts, with a significant gap in both digital tool usage and ICT self-efficacy. This contrasts with other tehsils, where male teachers generally outperformed female teachers. Tehsil Chowk Khan showed the highest overall performance, indicating stronger digital literacy and ICT skills, particularly among female teachers. However, Tehsil Kot Addu lagged behind in both digital tool usage and functional skills development, highlighting the need for targeted interventions and training to improve technology adoption and ICT integration. These findings emphasize the importance of addressing gender disparities and providing focused support to enhance digital skills in the region.

To improve functional skills development among teachers in Islamic secondary schools in Kot Addu South, it is recommended that educational authorities focus on enhancing teacher training in ICT integration. Providing teachers with ongoing professional development and access to modern digital tools can help increase their confidence and ability to effectively use technology in the classroom. Additionally, improving the ICT infrastructure in rural schools is crucial, ensuring that both teachers and students have access to necessary resources. Finally, fostering a supportive learning environment that encourages students to build digital literacy and ICT self-efficacy will enable them to better develop essential functional skills needed for academic and career success.

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