

THE IMPACT OF DIGITAL LITERACY SKILLS ON TEACHING CAPACITY AMONG UNIVERSITY FACULTY IN BALOCHISTAN

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Keywords

Article History

Received: 29 January 2026

Accepted: 14 March 2026

Published: 28 March 2026

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Abstract

This study prevailed the impact of digital literacy skills on teaching capacity among university faculty in Balochistan, Pakistan. Digital literacy impact all over the world is now universal, which effecting the academic environment as well. The study aims to determine the level of digital literacy skills among university faculty assess their teaching capacity, examine the relationship between digital literacy and teaching related practices across selected demographic and institutional characteristics. A quantitative survey method was used to collect data from university faculty members working in three universities of Quetta Balochistan, Pakistan. University of Balochistan (UOB), Balochistan University of Information Technology, Engineering and Management Science (BUIITEMS), and Sardar Bahadur Khan Women's University (SBK). The study population consisted of 1,430 faculty members. A sample of 312 respondents was determined using Yamane's formula while 295 completed and valid questionnaires were received yielding an overall response rate of approximately 95%. A structure questionnaire employed to collect information regarding demographics characteristics, technological tool usage, digital literacy skills, teaching capacity, challenges in developing digital literacy skills and the contribution of digital literacy to academic and teaching activities. The reliability analysis showed acceptable internal consistency with Cronbach's alpha value reaching from .807 to .904 for the major constructs. The finding show that university faculty generally possess moderate to high level of digital literacy skills and demonstrate positive perceptions regarding their teaching capacity. The finding further indicate that digital literacy skills contribute positively to teaching related activities. However some challenges were identified particularly limited access to reliable internet variations in institutional support and difference in opportunities for developing digital competencies. Overall, the study conclude that digital literacy is an important component of contemporary teaching capacity in higher education. Continuous professional training accessible technical support reliable internet connectivity updated digital resources and collaborative opportunities among faculty members are recommended to strengthen digital competencies and improve technology enhance teaching practices in universities of Balochistan.

Introduction

There have been changes in how higher education is organized, delivered and assessed due to the

digital transformation. Learning management systems, electronic libraries, video conferences, cloud applications, online assessment

technologies, artificial intelligence, and growing digital deliveries are some of the aspects that define what university teachers do today. These technologies will be able to facilitate flexible access, collaborative learning, quick feedback, multimedia exposition, and databased teaching. Their pedagogical worth though not determined by their existent presence and more by the abilities of the teachers to pick, assess, change and employ them as learning resources. UNESCO (2023) highlights technology is not necessarily an improvement of education; its impact requires equal access, proper governance, relevance of the technology, and a qualified teacher. Digital literacy has therefore moved to a core professional asset opposed to technical privilege to faculty in universities.

Digital literacy goes farther than knowable how to use a computer, make some slides, or send messages via email. It uses the knowledge, skills, attitudes, and judgment required to search and find information, evaluate its credibility, electronically organize data, responsibly communicate, generate digital content, secure privacy, solve electronic issues and engage ethically in the digital space. Falloon (2020) points out that teacher digital competence should also combine both technical and pedagogical, ethical, personal, and professional aspects. Equally, DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use (DigComp) has five areas that connected, including information and data literacy, communication and collaboration, digital content creation, safety, and problem solving (Vuorikari et al., 2022). These domains offer an in-depth foundation of studying whether faculty members are able to harness digital technologies in an assured, skeptical, innovative and responsible way. Digital literacy in the field of higher education assumes a strictly pedagogical shape. Members of the faculty do not just need general digital skills, but how to convert disciplinary learning in the translation into effective technology enhanced learning opportunities. They have to decide how a digital resource should be use to achieve a specific goal, how to design materials to be accessible, how to control the online communication, how to

track the participation, how to give their feedback, how which data could be used to safeguard student information, and how effective the electronic sources could be. DigComp by Redecker (2017) has seven categories of educator competence: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and helping learners to become digitally competent. This paradigm demonstrates that the use of technologies frequently cannot determine an effective digital teaching. This has purposeful and inclusive, reflective and pedagogical justified use.

2 Research Objectives

1. Determine the level of digital literacy skills among faculty members in universities of Balochistan.
2. Investigate the impact of digital literacy skills on teaching capacity among faculty members in universities of Balochistan.
3. Identify the challenges faced by university faculty in developing digital literacy skills in universities of Balochistan.
4. Evaluate the roll of digital literacy in enhancing both research innovation and educational quality among faculty members in universities of Balochistan.

1.3 Research Questions

1. What is the level of digital literacy skills among university faculty in Balochistan?
2. What is the level of teaching capacity among university faculty in Balochistan?
3. What relationship exists between digital literacy skills and teaching capacity among university faculty in Balochistan?
4. Which dimensions of digital literacy skills significantly predict the teaching capacity of university faculty in Balochistan?

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Literature Review

Hamutoglu *et al.* (2019) determined the digital literacy skills and opinions of 47 prospective teachers in the departments of a state university in Turkey. The study was designed as a quasi-experimental with a one group pretest posttest design. The data were collected using Attitude towards E-learning Scale and the Digital Literacy Scale. Proportions of 35% of digital literacy, 24% of the technical component and 11% of the cognitive component were reported.

Omosekejimi *et al.* (2019) explored the use of information and communication technology (ICT) and digital literacy as means of effective teaching in the colleges of education in Nigeria. They included 1500 academic members in four educational institutions in South West Nigeria. So, 150 respondents were selected from that population, that is, 10% of the population, and questionnaires were given to them. The results indicated that the use of ICT and digital literacy if used properly will be able to significantly assist the lecturers in their teaching. The computers, printers, photocopiers, projectors, interactive whiteboards, electronic notice boards, internet facilities and CD-ROMs were all found to be relevant to the educational tools.

Information literacy and Digital literacy can influence an individual's attitude to using digital tools for learning. Aavakare (2019) tested a theoretical model on a sample of 249 participants which was based on previously published studies on both types of literacy as well as the Unified Theory of Acceptance and Use of Technology 2. The analysis showed that the digital literacy had more influence on intention to use learning technologies than information literacy. This intention was significantly related to digital literacy, but not information literacy. The results of mediation analysis also revealed that the relationship between digital literacy and desired

digital learning tools use was partially mediated by habit and performance expectancy. (Aavakare, 2019).

Beetham, *et al.* 2009 presented digital and emerging literacies in the UK by using the concept of learning literacies, which refers to "the practices that enable effective learning in a digital era." This view acknowledges the role of digital technologies and networks in transforming work, learning and communication, while universities remain the site of the development of thinking, thinking together and the sharing of ideas. Digital literacy is not just about being able to use ICT. It also includes confident and critical technology use in decision-making, learning and communication in the workplace, as well as academic, information and media literacy practices.

In this context, Ismail *et al.* (2024) investigated the digital information literacy skills among faculty members in public-sector universities of Peshawar, Pakistan and saw their link with personal and academic attributes. A total of 1,678 faculty staff members from six public universities were surveyed. A research instrument based on the related studies was sent to the 500 faculty members and 30% of the faculty members were selected from each of the universities. Of these, 340 usable questionnaires were returned, representing a 68% return. Respondents were confident in 13 digital information literacy skills such as using digital journals and online discussion groups. While they were comfortable with computers, many were less able to find literature that they needed. There were also large differences among those who specialized, those who were educated, and those whose social background was different.

According to Ghaffar *et al.* (2024), digital and information literacy skills are crucial for the University faculty who use them to assist in academic work, knowledge sharing and knowledge creation. They studied the impact of these skills on knowledge sharing and research productivity amongst the teachers of three top general category universities in Pakistan. The design of the survey was quantitative and the sampling technique employed in the study was Systematic random

sampling. Statistic Package for Social Sciences (SPSS) was used to test the proposed hypotheses. The digital skills and information literacy had both significant positive impacts on knowledge sharing and faculty research output. The study thus revealed these skills as important skills to be developed in the management of university and provided evidence of their role in academic productivity. The study was not only designed to measure the two literacy areas but to link them to real-world academic results that are at the heart of faculty effectiveness. Knowledge sharing involves the transfer of knowledge between colleagues; research productivity involves the development and dissemination of new knowledge. Both areas saw significant results, indicating that the importance of literacy skills goes beyond using digital devices. Faculty members too must be able to find and handle trustworthy information in the proper way and present it to the right academic forums. The study determined that by looking at these relationships as a whole, an integrated picture of how digital and information literacy might be used to aid university work could be formed. Its conclusions were also used as a reference by the university's administration when they were thinking about training and institutional support to support faculty output.

Butt *et al.* (2023) To explore Higher Education Commission (HEC) rankings and the online readiness of the university, the researchers conducted a survey of 650 university employees that included questions about the availability of technological facilities, technological behaviour and competencies, and university leadership practices. Modified questionnaires were used to collect data, which was then analysed in SPSS. The findings showed that technology was transforming the nature of work and leadership in higher education, and the university leaders were in an important position in creating a digital institutional culture. Based on these results, the researchers made a proposal of an e-leadership framework for the implementation of digital policy in public universities. The key dimensions were related to e-leadership style, competencies and skills, and digital services and infrastructure.

Alenezi *et al.* (2023) defined digital education as a "technologically mediated shift in some aspects of the education system. They talked about the opportunities and challenges of using ICT, new innovations in the digital world and the growth of massive open online courses. The internet has transformed the way in which teachers communicate and collaborate, and in the digital revolution information has been made available at a much broader scale than ever before across national barriers. There are now a range of ICT resources in contemporary classrooms and progress in their use in extending access to information and enhancing learning opportunities by many teachers. Higher education institutions need to be strategic in the use of ICT to provide affordable, high quality education in an era of digital transformation, disruptive innovation and rapid change. It wasn't just about buying technology. Institutions also require the framework of policies, staff capacity and practices, to transform the tools that are available into an effective learning experience without compromising student access to learning.

In the distance education, the 3M framework was created to address the challenges of distance education, which were later extended to the Open, Distance and Digital Education (ODDE) field by Richter & ArasBozkurt (2022). The model identifies three general levels of inquiry: ODDE structures and theories are considered at the global macro level, management, organization and technology are at the institutional meso level and teaching and learning is at the individual micro level. They performed bibliographic analysis, in which they traced the topic development and the trends in the research. The COVID-19 pandemic was seen as an eye-opening moment and a shift in practice and scholarship throughout the industry. The authors also uncovered four groups of academic journals based on the similarities and differences between the themes and the disciplinary settings of Educational Technology, Distance Education, and Instructional Design.

Research Design and Research Method

Finding the most effective and suitable research technique to accomplish the goals of the study is

one of the most crucial parts of any research project. A research technique is the overall strategy for carrying out any study, which saves time and gives the research a structured framework. Using a quantitative methodology, the current study assesses the impact of digital literacy skills on teaching capacity among university faculty in Balochistan. The demographic, sampling strategy, sample size, measurement tool, validity and reliability of the measurement, data collection process, response rate, statistical methods employed.

Research study a set of processes and criteria, such that the knowledge gained is based on facts rather than personal opinions, bias, or random thoughts. This process of estimating numbers in quantitative research provides the fundamental link between empirical observation and mathematical expression of quantitative relations. In quantitative research, data typically selected and analyzed in a numerical form Basias & Pollalis, (2018). That why quantitative research approach was used for conducting this study.

This study based quantitative approach to collect data from intended respondents. The survey

method is very broad term that embraces research methodologies that deal with phenomena by analyzing experiences, behaviors and relations without the use of statistics and mathematics and the processing of numerical data, Merriam, (2009), Hennink et al. (2010). For the purposes of this study, the target population has dispersed geographically throughout Balochistan, Pakistan. Consequently, this study carried out using a cross-sectional survey result design. The instrument for gathering data was a paper based questionnaire.

Data Analysis and Interpretation

Institute/university

The study sample included participants from three institutions. University of Balochistan (UOB) contributed the largest proportion 38.3%, followed closely by Sardar Bahadur Khan Women's' University (SBK) 31.5% and Balochistan University of Information Technology Engineering and Management Sciences (BUIEMS) 30.2%, indicating a relatively balanced representation of the three universities.

Institute/ university wise response. (N=295)

S. No	Institute/ University	Frequency	Percentage
1	UOB	113	38.3
2	BUIEMS	89	30.2
3	SBK	93	31.5
	Total	295	100.0

Designation

Among the two hundred ninety five (295) participants, the majority were Lecturers/ Instructors 47.1%, followed by Assistant

Professors 35.9%. Senior Lecturers, Associate Professors, and Professors together accounted for the remaining 17%, indicating that mid-level academic staff were the predominant respondents.

Designation wise response. (N=295)

S. No	Designation	Frequency	Percentages
1	Lecturer/Instructor	139	47.1
2	Senior Lecturer/Senior Instructor	8	2.7
3	Assistant Professor	106	35.9
4	Associate Professor	23	7.8
5	Professor	19	6.4
	Total	295	100.0

Experience

Among the two hundred ninety five (295) participants, most had 11–20 years of professional experience 56.3%, indicating a well-experienced

academic sample. Only a small fraction had less than 5 years 11.2% or more than 25 years 1.7% of experience.

Experience wise response. (N=295)

S. No	Experience	Frequency	Percent
1	1-5 years	33	11.2
2	6-10 years	74	25.1
3	11-15 years	87	29.5
4	16-20 years	79	26.8
5	21-25 years	17	5.8
6	26 & above	5	1.7
	Total	295	100.0

Gender

The sample comprised more females 55.6% than males 44.4%, indicating a slightly higher

representation of female participants among the two hundred ninety five (295) respondents.

Gender wise response. (N=295)

S. No	Gender	Frequency	Percent
1	Male	131	44.4
2	Female	164	55.6
	Total	295	100.0

Status of Faculty Regarding Technological Tools

The results show that respondents reported the highest use or agreement for Mobile (smart) phone $M = 3.93$, Email services (e.g., Outlook, Gmail) $M = 3.80$, and Word processor (e.g., Word, Pages) M

$= 3.66$, while the lowest was for Wearable device (e.g. Smartwatch, fit bite) technology $M = 2.27$. Standard deviations indicate moderate variability across items, suggesting some diversity in technology usage among participants.

Technological Tools wise response (N=295)

S.No	Technological Tools	Mean	SD
1	Mobile (smart) phone	3.93	1.336
2	Tablet	2.86	1.363
3	Desktop computer	3.41	1.217
4	Leftop computer	3.32	.986
5	Game console	2.93	1.484
6	Wearable device(e.g. Smartwatch, fit bite)	2.27	1.457
7	Word processor (e.g., Word, Pages)	3.66	.969
8	Spreadsheet (e.g., Excel, Numbers)	3.59	.992
9	Presentation (e.g., PowerPoint, Keynote)	3.28	1.152
10	File sharing (e.g., Google Drive, Dropbox)	2.85	1.416
11	Photo editing (e.g., Photoshop, PhotoScape)	2.91	1.549
12	Website management (e.g., WordPress,)	2.70	1.445
13	Email services (e.g., Outlook, Gmail)	3.80	.882

14	Social media (e.g., Facebook, Instagram)	3.44	1.107
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Impact of digital literacy skills on teaching capacity

The descriptive statistics indicate the most impact of digital literacy skills on teaching capacity items were rated moderately high ($M = 3.3-3.8$), reflecting general agreement among participants. I

Teaching capacity wise response (N=295)

S.No	Teaching capacity	Mean	SD
1	I know how to solve my own technical Information and Communication Technology (ICT related) problems.	3.74	1.372
2	I can learn new digital technology easily.	3.54	1.166
3	I keep up with new important digital technologies.	3.77	1.112
4	I know about a lot of different digital technologies	3.31	1.067
5	I have technical skills I need to use digital technologies for working/learning and to create artefacts (e.g. presentations, wikis, blogs) that demonstrate my understanding of what I have learnt.	3.83	1.046
6	I do not have good digital technology skills.	1.99	1.407
7	I am confident with my search and evaluate skills in regards to obtaining information from web	3.75	1.062
8	I am familiar with issues related to web-based activities (e.g. cyber safety, search issues, plagiarism).	3.62	1.087
9	Digital technology enables me to collaborate better with my peers on project work and other learning activities.	3.70	1.091
10	I frequently obtain help with tasks from my friends over the internet (e.g. through Facebook, skype, blogs).	3.64	1.215

do not have good digital technology skills stands out with a low mean $M = 1.99$ and high variability $SD = 1.407$, suggesting it may not align well with the other items in the scale.

Determine the level of digital literacy skills

The descriptive statistics suggest that most items in the digital literacy skills have improved the quality of my research scale were rated moderately high ($M = 3.37-3.95$), showing general agreement among participants. Digital literacy has increased

my engagement with students stands out as a problematic item with a very low mean and higher variability ($M = 1.73$, $SD = 1.213$), indicating it may not align well with the construct measured by the rest of the items.

level of digital literacy skills wise response (N=295)

S.No	Determine digital literacy skills	Mean	SD
1	My digital literacy skills have improved the quality of my research.	3.85	1.313
2	I utilize digital tools to collaborate with researchers globally.	3.61	1.137
3	Digital literacy has enhanced my ability to access diverse academic resources.	3.86	1.086
4	I incorporate digital technologies to make my teaching more effective.	3.37	1.067
5	My proficiency with digital tools has led to innovative teaching methods.	3.95	.941
6	Digital literacy has increased my engagement with students.	1.73	1.213
7	I use digital platforms to disseminate my research findings widely.	3.85	.982
8	Digital skills have enabled me to participate in interdisciplinary research.	3.73	1.024
9	I feel that digital literacy is essential for academic advancement.	3.81	1.005

10	My institution recognizes and rewards digital innovation in teaching and research.	3.64	1.215
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Statistical analysis constructs across academic disciplines (N=295)

Construct	Arts & Humanities (N=29)	Biological & Medical Sciences (N=78)	Business Education (N=15)	Engineering & Technology (N=26)	Physical Sciences (N=66)	Social Sciences (N=68)	Other (N=13)
	M SD	M SD	M SD	M SD	M SD	M SD	M SD
Level of digital literacy skills	3.621 0.820	3.378 0.790	3.520 0.696	3.377 0.891	3.380 0.795	3.509 0.760	3.339 0.820
Teaching capacity	3.621 0.820	3.532 0.667	3.553 0.553	3.377 0.891	3.415 0.773	3.496 0.749	3.400 0.652
developing digital literacy skills	3.569 0.862	3.367 0.863	3.520 0.696	3.096 1.123	3.314 0.892	3.481 0.848	3.323 0.895
Determine digital literacy skills	3.614 0.790	3.559 0.659	3.580 0.436	3.412 0.886	3.465 0.680	3.610 0.576	3.500 0.574

presents the One-Way ANOVA results examining differences in constructs across respondents' academic disciplines. The analysis revealed no statistically significant differences among the disciplines for any of the study constructs. Specifically, Level of digital literacy skills ($F = 0.565$, $p = .758$), Teaching capacity ($F = 0.454$, $p = .842$), developing digital literacy skills ($F = 0.948$, $p = .461$), and Determine digital literacy skills ($F = 0.506$, $p = .803$) all produced p-values greater than the significance level of 0.05. Therefore, the null hypothesis accepted for all four constructs, indicating that respondents from different academic disciplines held similar perceptions.

Findings

The findings indicate that respondents frequently use technological tools that are essential for

communication, academic learning, and everyday educational activities. Mobile phones emerged as the most commonly used technological device because they provide easy access to educational resources, online classes, social networking platforms, and communication applications.

The majority of respondents agreed that their digital competencies enable them to perform teaching-related tasks more effectively. Faculty members reported that they are capable of solving ICT related technical problems, which supports the smooth integration of digital technologies into classroom instruction and other academic activities. The findings further reveal that respondents are able to learn new digital technologies easily and regularly update themselves with emerging digital tools. This suggests that faculty members are adaptable to

technological changes and are willing to enhance their teaching practices by adopting new digital resources.

The findings show that the teaching faculty possesses a good level of digital literacy skills. The majority of respondents reported that they have the necessary technical knowledge and practical skills to use digital technologies effectively in their teaching and learning activities. Faculty members believe that they can solve ICT related technical problems independently, demonstrating their confidence in handling digital tools and technologies in academic settings.

The findings indicate that academic discipline did not significantly influence respondents' perceptions of the study variables. The reliability observed among different disciplines suggests that the understanding and application of digital literacy skills are common across various academic fields. Overall, the findings demonstrate that faculty members, irrespective of their disciplinary background, possessed a similar perspective regarding digital literacy competencies, highlighting the universal importance of digital literacy within higher education institutions.

Conclusion

The study also concludes that existing digital teaching training does not sufficiently address the practical needs of faculty members. In particular, greater attention is required to develop skills related to managing time and using digital technologies effectively in academic settings. Without regular and practical training, faculty members may face difficulties in adapting to changing technological requirements. Moreover, insufficient institutional support for research and professional development limits opportunities for faculty members to improve their digital competencies. Overall, strengthening digital literacy among university faculty can contribute to more effective technology integration, improved teaching practices, and a better teaching and learning experience in higher education institutions in Balochistan.

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