

ASSESSING THE LEVEL OF DIGITAL COMPETENCY AMONG UNDERGRADUATE ALLIED HEALTH SCIENCES EDUCATORS: A MIXED-METHOD STUDY

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ABSTRACT

Objectives: To evaluate the digital skills of undergraduate allied health sciences educators using the European DigCompEdu framework and to identify barriers and enablers affecting their use of digital tools for teaching and learning.

Materials & Methods: This study employed a sequential explanatory mixed-methods design from January to April 2025. In the quantitative phase, a self-assessment questionnaire based on the DigCompEdu framework was given to all 83 eligible educators; after excluding seven with less than six months of experience, 53 completed responses (26 via Google Forms, 27 on paper) were analyzed. Participants identified as newcomers or integrators were interviewed to gather qualitative data on the needs and challenges affecting their digital competence.

Results: Among the educators in the Allied Health Sciences Department, 45% were integrators, 36% were leaders, and 19% were newcomers. Educators scored highest in facilitating students' digital competence (average 13.69 ± 7.5), while evaluation and feedback scored lowest (average 7.34 ± 4.1). A two-tailed Pearson correlation test indicated that professional status significantly affected digital competency ($p = 0.01$), whereas age, institutional affiliation, and gender were not significant factors.

Qualitative data analysis employed the thematic coding approach outlined by Braun and Clarke. It identified the digital divide (digitally illiterate students), insufficient digital resources (unreliable internet, absence of an official LMS), inadequate training and skills, lack of administrative support (such as limited technical staff and incentives), and professional status (non-permanent faculty) as major barriers to digital competency.

Conclusion: The Department of Allied Health Sciences must promptly enhance its administrative framework and digital resources to align with international educational technology standards. Institutions should address structural challenges by improving professional status, delivering focused training, and motivating digital involvement to support inclusive and sustainable digital capacity enhancement.

Keywords: Allied Health Sciences, Digital competency, Educators.

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INTRODUCTION

Educators' digital competency is a comprehensive framework of knowledge, skills, and abilities that enables educators to effectively and ethically use digital technologies to support teaching, learning, assessment, and professional growth. It includes pedagogical, technical,

and socio-ethical aspects, allowing educators to adapt to changing digital environments while enhancing students' learning experiences.^{1,2} The rapid development of digital technologies in the 21st century has transformed educational paradigms, requiring educators to develop strong digital skills to improve teaching effectiveness and student learning outcomes.

Modern students demonstrate greater intelligence, technological savvy, independence, and comfort with intercultural and global communication. The framework of Education 4.0 is specifically designed for Generation Z, considering their preferences and learning habits to equip students with skills in visual learning, project-based problem-solving, scenario-driven instruction, and the use of virtual and augmented reality technologies.⁴ As educators

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serve as both mentors and guides.⁵ They must maintain a high level of digital literacy to develop sufficient technical, cognitive, and socioemotional skills, enabling individuals to integrate technologies, teaching methods, and knowledge so they can align their capabilities with the requirements of the Education 4.0 framework.⁶

In the current educational environment, assessing teachers' digital skills is crucial to ensuring they can effectively integrate technology into their lesson plans.^{7,8} Academic institutions must equip their teachers with the digital skills needed to align technologies, pedagogy, and knowledge to prepare students for the digital world.⁹ There is a lack of research on evaluating the digital competency of educators in Muzaffarabad, AJK. This study aimed to determine the digital competency level of educators working with the Department of Allied Health Sciences at the University of Azad Jammu and Kashmir and to assess their challenges and needs related to digital competence.

MATERIALS AND METHODS

This research uses a sequential explanatory mixed-methods design. The study involved educators from the Department of Allied Health Sciences at the University of Azad Jammu and Kashmir, Muzaffarabad, including both permanent and non-permanent staff, as well as educators at their respective teaching hospitals. Educators from affiliated institutes such as the Federal Institute of Health Sciences (FIHS) and Capital Institute of Medical Sciences (CIMS), connected to the Department of Allied Health Sciences in Muzaffarabad, participated from January 2025 to April 2025. The study included all permanent and visiting faculty, undergraduate Allied Health educators, and affiliated institutes who consented to participate. Educators not actively teaching within the past six months were excluded.

Data collection procedure: For the quantitative phase, a questionnaire was distributed through Google Forms and in print, using a random sample of 83 educators. We received 60 responses. After excluding seven responses (< six months' experience), 53 observations were included for analysis, summarized in Table I.

The qualitative phase employed maximum-variation purposive sampling, with data collected via online and face-to-face mediums until data saturation. Twelve participants, ranging from newcomers to integrators, were interviewed.

Data tools: Quantitative data were collected using a DigCompEdu self-assessment questionnaire (22 items, six domains) adapted from the Joint Research Centre of the European Commission's Science and Knowledge Service.¹⁰

Qualitative data were gathered using a semi-structured, open-ended interview guide attached as Annexure

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Ethical approval: Ethical approval (1-12/IHPER/MHPE/KMU/25-15) obtained from the Ethical Board of IHPER, Khyber Medical University, Pakistan.

Ethical approval (75/FoH&MS/2025) from the Department of Allied Health Sciences, Muzaffarabad, University of Azad Jammu and Kashmir, was obtained. **Data analysis:** The quantitative data collected from the educators through a self-assessment questionnaire were analysed using statistical software (IBM SPSS Statistics 20) using frequencies, mean, standard deviation, and a two-tailed test. The responses provided on the questionnaire were classified into six distinct categories: Newcomer (A1), Explorer (A2), Integrator (B1), Expert (B2), Leader (C1), and Pioneer (C2), reflecting varying levels of digital competence (10). Six competency groups were classified into three levels: A1 and A2 represent newcomers, B1 and B2 indicate integrators, and C1 and C2 signify leaders. Two-tailed Pearson's correlation is used to assess the relationship between digital competency and other variables, such as age and gender.

For qualitative data analysis, primary data consisted of transcribed interviews, audio recordings, and notes taken during the sessions, utilising the thematic coding approach outlined by Braun and Clarke.

RESULTS

Quantitative results: According to the analysis of the self-assessment questionnaire, 45% (n=24) of Allied Health Sciences Educators perceived themselves as integrators, 36% (n=19) as leaders, and 19% (n=10) as newcomers, as shown in Figure I. Figure II shows the distribution of scores educators obtained on the self-assessment questionnaire across all six competency areas. Table II shows that educators scored highest in facilitating students' digital competence. The level of digital competency in professional engagement, teaching, and learning is higher than that of digital resources and student empowerment. Evaluation and feedback scored the lowest, indicating the lowest competency level among educators in this area.

Relationship with professional status: A two-tailed Pearson correlation test showed that professional status significantly influenced digital competency, with a p-value of 0.01. Permanent faculty exhibited notably higher digital skills, while non-permanent educators showed lower digital competence.

Relationship with other features: Conversely, no significant difference was found in the digital competencies of female and male educators, as participants perceived themselves as equally capable regardless of gender. Additionally, there was no notable variation in digital competencies among educators from different institutions

or age groups. Qualitative results: The analysis employed Braun and Clarke's thematic coding method. Initial codes were generated from transcribed interviews and organized to identify emerging themes.

These themes were then defined and labeled for clarity and consistency, as shown in Table 3. Frequencies indicate how often each code appeared in the data, providing insight into the prominence of specific issues. A thematic analysis of interview responses assessed the themes discussed below.

Lack of administrative support: According to educators, relative institutes do not provide technical assistance (12/12). There is no dedicated technical staff for technological integration, which creates obstacles in effectively managing information and communication technology and digital devices. Non-permanent faculty find it challenging to coordinate resources with institutional staff due to limited time. Visiting faculty often report low incentives, which diminish their interest.

Table No 1: Distribution of participants as per institute.

Institute of Educators	Frequency (n)
University of AJK	37
Affiliated institute	16
Total	53

Table No 2: Mean scores across various competency domains.

Competency Area	Mean	SD
Professional engagement	11.53	5.3
Digital Resource	8.40	4.1
Teaching and Learning	11.38	5.6
Evaluation and Feedback	7.34	4.1
Student Empowerment	8.70	4.8
Facilitating Students' Digital Competence	13.68	7.5

Table No 3: Thematic analysis table for qualitative data.

Themes	Sub-themes	Frequency of participants reported
Lack of administrative support	Lack of technical support. Low incentives	100% (12/12)
Professional status	Lack of time to prepare technology-integrated lessons due to other jobs. Low incentives lead to a lack of interest. Lack of coordination with institutional staff.	75% (9/12)
Digital divide	Digital illiterate students. Lack of effective internet availability for students.	66% (8/12)
Inadequate digital resources	Lack of an effective internet system. Classrooms are not technologically integrated. Inadequate digital devices. Lack of an official platform (LMS)	58% (7/12)
Inadequate skills and training	Lack of skills to conduct e-assessment. Lack of skills to integrate technology and pedagogy. Lack of training programs	33% (4/12)

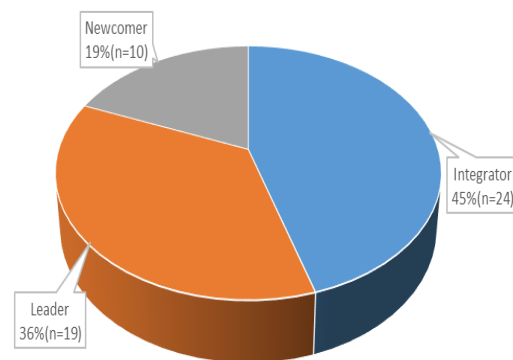


Fig 1: Distribution of educators according to their level of digital competency.

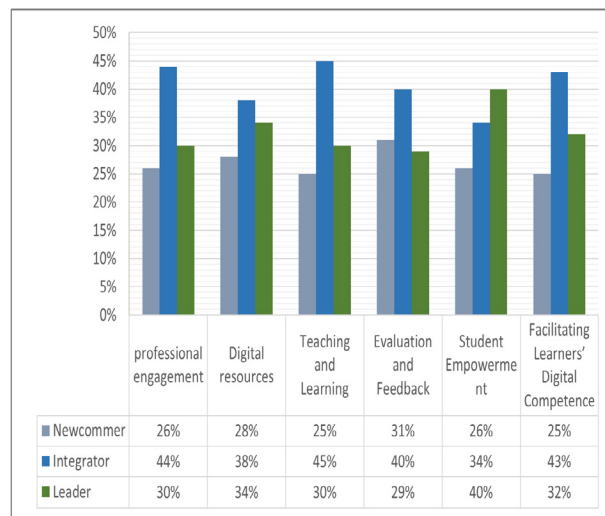


Fig 2: Distribution of educators' level across various competency domains.

Professional status: A significant portion of staff at the university and its affiliated institutes are non-permanent. Additionally, visiting faculty members reported (9/12) low motivation to dedicate time and effort to their part-time roles, which hampers their ability to prepare and plan effectively. As a result, they often rely on traditional lecture methods.

Digital divide: Many educators (8/12) have identified it as a critical issue for student empowerment. Students' lack of digital literacy and limited internet access are significant obstacles to facilitating their digital competency.

Inadequate digital resources: The digital tools educators use to integrate technology in the educational setting, such as multimedia projectors, LMS software, and internet access, are insufficient to meet teachers' needs. Classrooms lack the necessary technical resources to effectively integrate technology into teaching. Educators (7/12) reported a decline in digital competency due to limited resources. Permanent staff often reported having access to digital devices, but this remained a concern for non-permanent faculty.

Insufficient skills and training: Many educators (4/12) lack the technical expertise to administer e-assessments or to integrate technology and pedagogy effectively. They highlighted a strong need for training in online teaching methods, learning techniques, and strategies for online assessment and feedback.

DISCUSSION

This research study assessed educators' digital skills using a sequential explanatory mixed-methods approach. Quantitative data from participants completing a self-assessment questionnaire revealed that 45% of educators rated themselves at levels B1 or B2. A positive trend was apparent, with 36% of educators demonstrating advanced digital competence, categorized as "leaders," which indicates a potential for widespread adoption of digital teaching methods.

These educators are well-positioned to prepare students to meet the demands of the globalized digital world.

Only nine educators evaluated themselves as beginners. The study results, with 45% reporting levels B1 or B2, relate to other studies specifically within the integrator stage.^{8, 11, 12}

Educators have advanced under technological globalization, with 36% perceiving themselves at C1 and C2 levels. This supports the findings of Mehmood S (2023), which revealed that many educators are competent in effectively integrating technology to achieve educational objectives. This contradicts some other studies where a very low number (6%) of educators are at the leader level.^{8, 14}

This study evaluated a high level of digital competence in digital resources, professional engagement, and the use of digital technology in the learning and teaching process. In this research, educators scored higher on professional engagement and teaching and learning, but lower on digital resources (mean 8.40 ± 4.1).

In contrast, Mora-Cantalops M (2022) indicated that digital competency is independent of professional status and institutional setup. However, a significant disparity exists in their professional status, with a p-value of 0.019. The permanent faculty demonstrated higher levels of competence and often held leadership roles, while non-permanent faculty scored lower. It was also observed that there is no significant difference in educators' digital competency across institutions, which aligns with Mora-Cantalops M (2022).¹⁰

In contrast to another study by Ahmad, S (2021), which found that male teachers utilized digital technology with greater confidence than female teachers, this study observed no significant differences in the digital competency levels of male and female educators.¹⁵

Participants reported similar abilities regardless of gender, indicating that digital competency is not dependent on gender.¹⁰ A lack of institutional training programs highlights a significant gap in educators' technical and pedagogical skills. Educators in the current study also expressed the need for training in online teaching methodologies, learning strategies, and e-assessment techniques.^{16, 17}

The digital divide and lack of institutional support hinder student empowerment and learners' digital facilitation. When combined with extensive research showing disparities in digital access, the reported reliance of educators on informal channels like WhatsApp for resource sharing due to institutional limitations emphasizes the urgent need for reliable internet infrastructure and an effective Learning Management System to unify students, educators, and administration on one platform.^{12, 18}

Non-permanent faculty show lower competence, supporting the argument that teachers' digital competence is positively and moderately linked to the number of digital devices they access. This study also reveals that educators within the same institution demonstrate varying levels of competence depending on their access to digital devices.

As evidenced by studies aligning with UNESCO's fourth goal of sustainable development, and to prepare them for the digital age. Effective integration of technology goes beyond using it for its own sake; it involves using it to deepen students' learning experiences. Digital transformation raises key questions about teachers' digital competence. Building on the DigCompEdu framework, the current study aims to uncover the level of digital compe-

tence of science teachers and their perceptions towards it as well as to identify the factors influencing this competence.

The study adopted a mixed-methods approach utilizing a sequential explanatory design. This design involved a questionnaire which was administered to a sample of 611 science teachers, while a semi-structured interview was applied to 13 teachers. The results indicate that the teachers' level of digital competence was medium (58.4%, educators within institutions equipped with robust digital infrastructure and integrated curricula display higher proficiency levels.^{19 dd}

The study examined educators' need for dedicated time, collaboration, practical learning, and support to enhance their digital skills. It emphasizes the vital role of institutional support in developing digital competence by utilizing recognition and reward systems to motivate teachers to pursue professional development and adopt innovative teaching practices.²⁰

This research focused solely on educators from a single department, resulting in a small sample size. As a result, the findings may not be applicable to all educators at UAJK Muzaffarabad. Examining educators' needs and challenges is mainly based on their perspectives, which can limit the overall understanding of the situation.

Further research is recommended to identify institutional challenges in improving educators' digital skills. There is also an opportunity to assess leader educators' strategies for managing underlying challenges.

CONCLUSION

This article underscores the gap between educators' current digital competencies and the required proficiency levels, providing a foundation for improvement by delineating their underlying needs and challenges. These barriers hinder their preparedness for the evolving demands of global educational technology. The findings enable institutions to invest strategically in targeted interventions, ensuring the development and enhancement of educators' digital competencies to meet the needs of a technologically adept society.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Iqbal S	✓	✓	✗	✗	✓	✗
Adeeb H	✓	✗	✓	✓	✓	✗
Sherwani B	✓	✓	✗	✗	✗	✓
Naqvi F	✓	✗	✓	✓	✓	✗

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Ethical Approval:

This Manuscript was approved by the Ethical Board of IHPER, Khyber Medical University, Peshawar. Vide No. 1-12/IHPER/MHPE/KMU/25-15. Dated: 14 04 2025



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