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STUDY OF ENCOURAGING NEW WAYS OF TEACHING IN RELATION TO DIGITAL SKILLS

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Abstract:

The swift progress in society in recent years has required alterations in the expectations of both citizens and educators. The incorporation of information and communication technology (ICT) into education has underscored the necessity of cultivating digital competence among educators, presenting a significant challenge for teacher training programs. This study seeks to assess the digital competency of educators engaged in Lifelong Learning in the Delhi/NCR region. A quantitative, cross-sectional research methodology was utilized to attain this purpose, utilizing a sample of 40 teachers from different schools in the region. The results indicated a substantial deficiency in instructors' abilities across the five aspects of digital competence, especially in digital content creation. The investigation revealed a direct association between previous ICT training and the aspects of communication, collaboration, and content production. The study revealed that instructors who voiced apprehensions over their preservice ICT training were generally younger and possessed fewer than 10 years of professional experience. This demographic insight indicates that younger instructors may perceive themselves as less equipped to properly use digital resources into their teaching methodologies. The continuous enhancement of digital teaching competency is a significant problem for the education system. It is essential to address this issue, as it will remain a primary focus in the training of contemporary educators. Improving digital proficiency is crucial for promoting creative pedagogical approaches and enabling educators to adjust to the changing requirements of the digital era. By prioritizing this development, we may create a basis for a transformational educational framework that facilitates successful learning and equips students for the future.

Keywords: Teacher Training; Digital competence; Information and Communication technologies; Educational challenges.

INTRODUCTION

In a progressively digitalized world, the field of education is advancing swiftly. Educators, as the foundation of education, are responsible for both delivering knowledge and navigating students through the dynamic array of skills, tools, and competences that characterize contemporary existence. The conventional educational model, which focused on fundamental information and memorization, is being supplanted by a paradigm that emphasizes adaptation, creativity, and ongoing innovation. Central to this transition is the principle of lifelong learning—a philosophy emphasizing the continuous enhancement of skills and knowledge throughout an individual's life. In this setting, teacher training is essential, especially for fostering digital competency and promoting classroom creativity. Lifelong learning has become a must in our ever evolving, technology-oriented world. As industries progress and novel technologies arise, the competencies necessary to traverse professional and personal domains also transform. For educators, this signifies that their function as facilitators of learning must transcend the classroom and conventional educational structures. Educators are now anticipated to be perpetual learners, consistently enhancing their competencies to adapt to the evolving educational landscape. This entails a significant focus on digital competence—the capacity to utilize digital tools and technology proficiently in both personal and professional settings. Digital competence has emerged as an essential element of effective pedagogy in the 21st century. It includes a spectrum of capabilities, from fundamental computer literacy to advanced competencies such as digital content creation, data analysis, and utilizing digital

platforms for communication and collaboration. As technology increasingly permeates all facets of society, the necessity for educators to possess proficiency in these skills is essential. Digital competence not only facilitates teachers' learning and professional growth but also cultivates a learning environment that equips pupils for the requirements of a digital society. The incorporation of technology in education fosters pedagogical innovation, resulting in more interesting and effective learning experiences for students.

Teacher training programs are crucial for enhancing digital competence among educators. Historically, teacher preparation mostly emphasized educational ideas and classroom management techniques. Although they remain significant, there is an increasing acknowledgment of the necessity to integrate digital literacy and competency into teacher education. This necessitates a transformation in both the substance and the presentation of teacher training programs. Pre-service and in-service training must increasingly incorporate modules on the utilization of digital technologies, online pedagogical practices, and the ethical ramifications of technology in education. Furthermore, educators should be motivated to embrace a philosophy of perpetual learning, remaining receptive to the integration of innovative technologies and pedagogical approaches in their practice. The advancement of pedagogy is intricately connected to the integration of technology into the classroom. Digital tools provide instructors the ability to explore innovative methods for engaging pupils and delivering knowledge. Interactive platforms, such as learning management systems (LMS), enable educators to develop dynamic classes accessible to students at any time and from any location. This adaptability not only caters to various learning styles but also fosters student independence and self-directed learning. Furthermore, the utilization of multimedia resources, including films, podcasts, and virtual simulations, can augment the learning process by rendering abstract concepts more concrete and relatable. The integration of technology in education presents several obstacles. A primary obstacle to the efficient implementation of digital tools in education is the insufficient digital competency of instructors. Although numerous younger educators may be adept at utilizing technology in their personal lives, they may lack the requisite skills or confidence to incorporate it into their pedagogical practices. In contrast, seasoned educators may find it challenging to keep up with the swift evolution of technology and may feel inundated by the necessity to perpetually enhance their competencies. Teacher training programs must consequently address these deficiencies by offering continuous support and resources for educators throughout their careers.

Alongside developing digital proficiency, teacher training programs must cultivate a culture of innovation and creativity. Innovation in education transcends mere technological integration; it necessitates a reevaluation of conventional pedagogical methods. Educators should be motivated to explore innovative pedagogical frameworks, including flipped classrooms, project-based learning, and collaborative learning settings. These methodologies transition the emphasis from teacher-centered instruction to student-centered learning, wherein students have an active part in their education. By cultivating a culture of innovation, teacher training programs can enable educators to acquire the skills and confidence necessary to employ novel teaching practices that improve student engagement and learning results. The significance of leadership in fostering educational innovation is undeniable. Educational leaders are essential in fostering an environment that encourages teacher experimentation and creativity. This encompasses provide essential resources, like access to digital tools and professional development opportunities, while also cultivating a culture of collaboration and ongoing enhancement. Educators require robust support in their endeavors to incorporate technology into their practices, necessitating effective leadership at both the school and district tiers.

Collaboration constitutes a fundamental element of pedagogical innovation. In the digital era,

educators are no longer confined to their classrooms; they have access to a worldwide network of peers who may exchange ideas, resources, and effective methodologies. Teacher training programs must prioritize the significance of collaboration, both within the educational institution and externally. This can be accomplished via online professional learning communities (PLCs), enabling educators to connect with colleagues, exchange experiences, and acquire knowledge from each other. By cultivating a collaborative perspective, teacher training programs can assist educators in remaining attuned to contemporary trends and developments in education. Furthermore, teacher preparation must encompass the ethical implications associated with the utilization of digital resources in education. The proliferation of technology in educational settings prompts significant inquiries around data privacy, digital citizenship, and the digital divide. Educators must possess the knowledge and abilities to address these situations responsibly. This entails comprehending the safeguarding of student data, advocating for responsible technology usage, and guaranteeing equitable access to essential digital tools for all students to thrive. By addressing these ethical considerations, teacher training programs can assist educators in establishing a secure and inclusive learning environment for all children.

The Horizon Report emphasizes that although technology and digital tools are ubiquitous in contemporary culture, they frequently do not improve learning unless they are well incorporated into the educational framework. Merely possessing digital resources is inadequate unless they are utilized wisely to enhance the educational experience. The Sustainable Development Goals (SDGs), established by the United Nations within the framework of the 2030 Sustainable Development Agenda, have begun to be associated with many educational programs. Of the 17 goals, SDG 4: Quality Education is the most pertinent to the domain of education. Attaining this objective necessitates an emphasis on digital teacher proficiency, regarded as an essential competency for enhancing educational efficacy. In this setting, digital competence has emerged as a fundamental ability that all persons must have by the conclusion of their basic education, especially in Europe. In India, the INTEF (National Institute of Educational Technologies and Teacher Training) is crucial in advancing educational techniques that integrate ICTs into various classroom environments. The institute is tasked with establishing both initial and continuous teacher training in five designated areas of digital competence. This focus guarantees that educators are prepared to incorporate technology efficiently, promoting educational advancement while also aligning with the overarching aims of the Sustainable Development Goals. (Table 1)

Table:1

Information and Information Literacy	Identify, locate, obtain, store, organize, and analyze digital information, data, and digital content, which assess their purpose and relevance to teaching tasks
Communication and Collaboration	Communicate in digital environments, share resources through online tools, connect and collaborate with others through digital tools, interact and participate in communities and networks, which all lead to cross-cultural awareness
Digital Content Creation	Create and edit new digital content, integrate and rework previous knowledge and content, create artistic productions, multimedia content and computer programming, to know how to apply intellectual property rights and licenses for use
Security	Acknowledge protection of information and personal data, protection of digital identity, protection of digital content, as well as security measures and a responsible and safe use of technology
Problem Solving	Identify needs to use digital resources, make informed decisions about the most appropriate digital tools according to the purpose or need, solve conceptual problems through digital media, use technologies creatively, solve technical problems, and update their own competence and that of others

In conclusion, it is important to consider additional definitions of digital competence that complement earlier ones. These definitions highlight four key competencies: (1) technical proficiency, (2) the ability to use digital technologies effectively in the workplace, (3) the capacity to critically assess digital tools, and (4) the motivation to engage with and contribute to digital culture.

To assess the level of digital literacy, several organizations have established frameworks to measure an individual's competence. Notable examples include the Common Framework for the Digital Competence of Teachers in Spain, the European Framework for the Digital Competence of Educators (DigComp), and the ISTE standards. Similar to how language proficiency is measured, these frameworks enable the evaluation of a person's digital competence based on their demonstrated skills, providing a clear understanding of their proficiency level.

ICT Use vs. Integration in Pedagogy

In response to the exigencies of the digital age, educators are now required to integrate Information and Communication Technology (ICT) into their daily pedagogical activities, departing from conventional approaches and adopting contemporary technologies. It is crucial to differentiate between the mere utilization of ICT and its genuine integration into education. Nkula and Krauss (2014) underscored that ICT integration transcends merely situating computers in classrooms or employing technology to enhance traditional pedagogical approaches. It entails utilizing technology to improve the teaching-learning process, enabling students to actively engage with ICT to gain new knowledge and skills. This form of integration situates ICT at the center of the educational experience, promoting its application across multiple disciplines instead of as an isolated element. Consequently, successful ICT integration fosters cross-curricular application, linking many domains of learning instead of considering ICT as a standalone subject (Nkula and Krauss, 2014).

Flanagan and Jacobsen (2003) contended that ICT integration ought to function as a conduit among educators, learners, parents, and the wider community. Wilson-Strydom and Thompson (2005) observed that the notion of ICT integration emerged as a reaction to the constraints of initial computer utilization in educational institutions, which predominantly emphasized the cultivation of computer literacy or technical competencies. They clarified that just instructing students in computer usage constitutes "implementation without integration," but employing ICT to enhance learning across multiple disciplines is termed "implementation with integration." UNESCO (2002) has urged member states to achieve equilibrium between conventional educational methods and modern technology, offering direction on the integration of multimedia, e-learning, and distant education into national education frameworks. Nonetheless, the successful integration of ICT in education presents a multifaceted problem, necessitating the synchronized operation of various internal and external elements.

Although ICT technologies are increasingly accessible in educational institutions, research across various cultural contexts indicates that educators are not fully utilizing these resources (Aldunate and Nussbaum, 2013). Various internal factors affect teachers' capacity to incorporate ICT, such as their beliefs regarding technology, attitudes toward ICT integration, confidence and motivation in utilizing ICT, and perceptions of its efficacy (Al-Ruz and Khasawneh, 2011; Chen, 2008; Lin, Wang, and Lin, 2012; Palak and Walls, 2009; Sang et al., 2010, 2011; Tezci, 2011). The preparedness and self-efficacy of educators, especially regarding technological, pedagogical, and integrative competencies, are also crucial factors.

Sang et al. (2010) discovered that preservice teachers possessing robust constructivist views

are more inclined to include technology into their prospective teaching methodologies. Frederick et al. (2006) recognized more internal difficulties, including student mobility, special needs, and anxiety, that can hamper ICT integration. Consequently, despite advancements in the accessibility of ICT technologies, numerous personal and contextual factors continue to affect instructors' ability to effectively use technology into their instruction.

1.2. Background

Cabero (2022) asserts that 21st-century educators must possess a diverse array of talents to properly facilitate technology-enhanced learning for students. This perspective is corroborated by an expanding corpus of material that underscores the necessity of evaluating and enhancing educators' digital abilities to tackle future educational difficulties (Cabero et al., 2022; García et al., 2023; Johnson & Li, 2024). Considering the growing significance of digital technologies in contemporary education, it is essential to assess the existing levels of digital competence among educators and promptly implement measures to improve their competency in this domain.

Numerous studies have concentrated on examining digital capabilities among educators at various educational tiers. Studies on pre-service teachers, especially those training for preschool and primary education, reveal that numerous prospective educators have merely an intermediate degree of digital proficiency (Alvarez, 2021; Brown, 2022; Smith & Jones, 2023). This level may suffice for personal use and self-directed learning, but it lacks the knowledge necessary to successfully instruct students in digital practices. According to García (2023), these prospective educators possess a fundamental comprehension of digital tools; yet, they lack the capability to incorporate them effectively into classroom education.

Furthermore, numerous studies emphasize particular domains in which both pre-service and in-service educators encounter difficulties with digital competencies. Evidence indicates substantial deficits in the informational aspect of digital competence, encompassing the exploration, selection, and synthesis of pertinent information (Cabero et al., 2022; Pérez, 2023). This represents a significant deficiency, as these skills are essential for the proper integration of digital resources into the educational process. Moreover, the literature highlights that contemporary educators frequently possess inadequate digital competencies to fulfill the requirements of the information society, particularly in cooperation, communication, and, most significantly, content production (Rodríguez, 2023; Williams et al., 2024). The production of digital content is notably inadequate, hindering educators' capacity to fully utilize technology in the classroom.

A prevalent subject in this research is the necessity for higher education faculty to enhance their comprehension of the educational applications of technological resources. Research indicates that insufficient digital competence leads instructors to utilize information and communication technology (ICTs) solely as auxiliary tools for conventional teaching approaches, rather than as innovative, transformative instruments (Johnson & Li, 2024). Educators must transcend this restricted application of technology to cultivate interesting, dynamic, and participatory learning environments.

Research indicates multiple aspects that affect the development of digital competence in educators. The determinants encompass the nature of the educational institution, gender, previous ICT training, academic credentials, teaching experience, and the sociocultural backdrop of the learning environment (Smith et al., 2023; García & Hernández, 2023). Each of these variables can profoundly influence a teacher's capacity to attain and proficiently employ digital skills in their instructional practice.

Global research substantiates the deficiency of digital competence, especially regarding educators' capacity to generate and disseminate digital information within the academic community (Williams et al., 2024; Lee & Chen, 2024). This insufficiency constrains the incorporation of ICTs into pedagogical practices, relegating technology to a subordinate, auxiliary function instead of positioning it as a principal instrument for instructional innovation. This circumstance highlights the necessity for coordinated initiatives to enhance digital proficiency among educators, especially in content development and dissemination.

Researchers underscore the necessity of enhancing teachers' capacity to implement active, technology-enhanced pedagogical strategies in the classroom to tackle these difficulties. Methods such as project-based learning, problem-based learning, the flipped classroom model, and mobile learning provide novel strategies to engage students and promote active involvement (Rodríguez et al., 2023). By mastering these methodologies, educators may cultivate more dynamic and significant learning experiences that equip students for the challenges of the digital era. Consequently, improving teachers' digital proficiency is essential for promoting pedagogical innovation and enabling both educators and students to succeed in a progressively technology-oriented environment.

1.3 Research Objectives

The literature study indicates that instructors' digital competence levels differ based on their educational context and teaching stage. The main aim of this study is to evaluate the digital competency of educators in Lifelong Learning programs. From this primary objective, the subsequent specific aims are delineated:

- Determine the domains in which Lifelong Learning educators have the most significant deficiencies in digital proficiency.
- Assess the existence of major disparities in digital competence contingent upon the ICT training previously undertaken by instructors.
- Examine the determinants that affect the likelihood of instructors obtaining prior ICT training.

Technological Pedagogical Content Knowledge (TPACK)

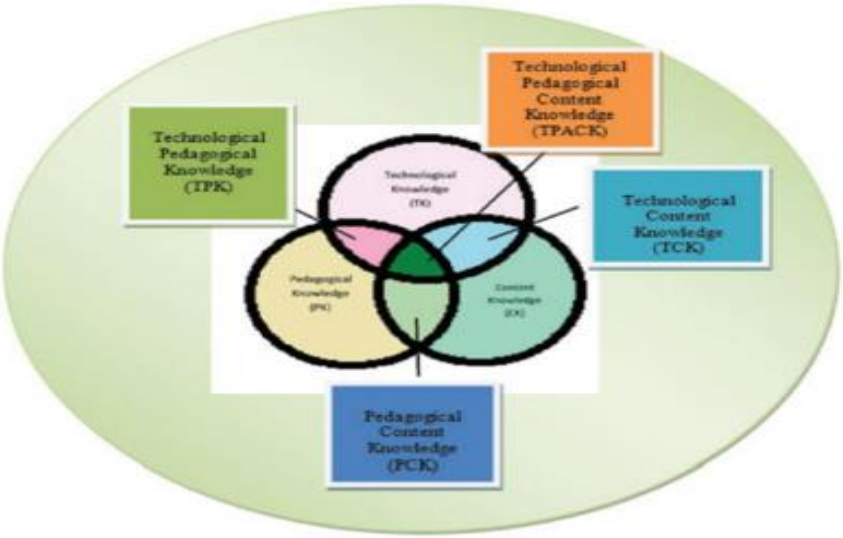
The TPACK framework arises from the understanding that teaching is a multifaceted endeavor necessitating the amalgamation of various specialized knowledge domains. Effective teaching relies on the capacity to utilize systematically organized, interrelated information, encompassing comprehension of student cognition and learning processes, mastery of topic content, and, crucially, proficiency in technology (Koehler & Mishra, 2008). The TPACK framework (Figure 1) arises from the convergence of several knowledge kinds as educators integrate ICT into their disciplines.

The primary categories of knowledge within the TPACK paradigm are Pedagogical Knowledge (PK), Content Knowledge (CK), and Technological Knowledge (TK). The three fundamental categories intersect to create supplementary knowledge types essential for ICT integration: Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Pedagogical Content Knowledge (TPACK) (Koehler & Mishra, 2008). TPACK represents the intersection of three knowledge domains, creating a holistic comprehension vital for the proper integration of ICT in education.

Koehler and Mishra (2009) assert that TPACK encompasses the comprehension of concept representation through technology, the implementation of pedagogical strategies that utilize technology for subject instruction, and the resolution of learning obstacles encountered by students through the use of technology as a resource. It necessitates an understanding of students' past knowledge and learning theories, together with the application of technology to enhance and broaden that knowledge. Effectively instructing with technology necessitates a dynamic equilibrium among these elements, consistently adjusting and revitalizing the methodology.

The TPACK framework offered significant insights to the researchers, facilitating the identification of the knowledge types necessary for effective ICT integration among participants. It also allowed for the evaluation of the knowledge areas that were either present or deficient, which are essential for the successful implementation of technology in education (Baran et al., 2011).

Frame work:



2.2. Instrument

The data gathering tool was a tailored questionnaire designed to evaluate digital teacher ability according to predefined characteristics. The assessment of 91 items, divided as follows: 16 things on information and information literacy, 31 items on communication and cooperation, 16 items on digital content production, 13 items on digital security, and 15 items on problem-solving. The questionnaire included a Likert scale comprising 10 response alternatives, from 1 (never) to 10 (always). The coding method corresponds with the many aspects and the competencies they encompass. Bartlett's test of sphericity was performed to assess the internal consistency of the variables, yielding a KMO score of 0.79 ($p < 0.001$). The instrument's reliability was assessed using Cronbach's alpha, which was 0.87, and the Guttman split-half method, resulting in a value of 0.74. Both reliability metrics demonstrated strong consistency, validating the efficacy of the study instrument.

2.3 Procedure and Data Analysis

Data collection occurred in the first quarter of 2024 with a Google Form. The questionnaire was disseminated repeatedly via internet platforms until voluntary responses were collected

from the sample individuals. Data analysis was conducted utilizing SPSS version 25.0 and R-Studio version 4. Descriptive statistics were then computed to assess participants' perceptions of their digital competency levels. The data distribution was subsequently evaluated using the Kolmogorov-Smirnov and Shapiro-Wilk tests, along with Levene's test for homogeneity of variance. The Mann-Whitney U test and Wilcoxon's W test were utilized to discern significant variations among individuals about the independent variable "Previous ICT training." Furthermore, to investigate the correlation between the independent variable and the dependent variables, a predictive model was constructed employing the H2O and Local Interpretable Model-agnostic Explanations (LIME) algorithms to assess the impact of diverse study variables on prior ICT training.

3. RESULTS

We first performed an analysis of the descriptive statistics (refer to Table 3), which elucidated the features of the sample. The gathered replies revealed a deficient level of digital competence, with no average scores attaining or surpassing five on the 1-10 scale. The aspect of digital content generation exhibited exceptionally low scores, nearing zero. In contrast, the security factor produced the highest results; yet, it remained below the minimum threshold necessary to be considered ideal.

Table 3. Descriptive statistics.

Dimension	Mean	SD	Asym	Kurt
B.1.	3.239	1.616	1.221	1.637
B.2.	3.185	1.466	0.628	9.049
B.3.	1.843	0.966	2.046	5.885
B.4.	3.954	1.103	−0.199	−2.587
B.5.	3.695	1.096	0.592	0.134

We initially evaluated the normality and homogeneity of variances to conduct the inferential statistics. The Kolmogorov-Smirnov and Shapiro-Wilk tests were performed, validating that the distribution of the gathered data did not conform to a normal distribution ($p < 0.01$). Subsequently, Levene's test was conducted, reinforcing this conclusion by demonstrating an absence of equality in variances ($p > 0.05$). Subsequent to these judgments, nonparametric statistical techniques were utilized. The Mann-Whitney U and Wilcoxon W tests were employed, indicating no significant differences in the digital competence development of the surveyed teachers concerning the independent variable "prior ICT training." Notable correlations were observed between the independent variables and the facets of communication and collaboration, in addition to digital content creation ($p < 0.05$) (refer to Table 4).

Table 4. U Mann–Whitney based on the variable "previous ICT training".

Dimension		Average Range	U Mann–Whitney	W. Wilcoxon	Z	*p*
B.1.	Yes	70.796	1757.406	4522.795	−1.164	0.178
	No	66.718				
B.2.	Yes	72.214	1882.500	5080.790	−0.906	0.047
	No	71.632				
B.3.	Yes	69.613	1815.125	5278.875	−0.982	0.033
	No	72.726				
B.4.	Yes	71.690	1722.038	3019.269	−0.657	0.272
	No	67.532				
B.5.	Yes	70.471	1845.933	4639.933	−0.762	0.122
	No	70.613				

To precisely delineate the dependency relationship of the variable "previous ICT training," we utilized the H2O technique. This methodology sought to construct a detailed model that could clarify the relationships between the dependent variables and the designated independent variable (refer to Figure 2).

For this investigation, we employed the distributed random forest model, recognized for its robustness and efficacy in managing complicated datasets. The results produced a substantial R coefficient of 96%, signifying a high degree of prediction dependability for the model. The Root Mean Square Error (RMSE) was determined to be 0.79, indicating a minimum disparity between the original dataset and the predicted values, thereby affirming the model's efficacy in accurately representing the underlying relationships within the data.

Cross-Validation Metrics Summary:

	mean	sd	cv_1_valid	cv_2_valid	cv_3_valid	cv_4_valid	cv_5_valid
accuracy	0.40555555	0.119379826	0.44444445	0.33333334	0.5	0.125	0.625
err	0.59444445	0.119379826	0.5555556	0.6666667	0.5	0.875	0.375
err_count	5.0	1.0	5.0	6.0	4.0	7.0	3.0
logloss	15.254475	4.7035155	19.484055	19.647358	9.520807	22.383183	5.236972
max_per_class_error	1.0	0.0	1.0	1.0	1.0	1.0	1.0
mean_per_class_accuracy	0.8173913	0.044125617	0.7826087	0.73913044	0.8913044	0.7826087	0.8913044
mean_per_class_error	0.1826087	0.044125617	0.2173913	0.26086956	0.10869565	0.2173913	0.10869565
mse	0.6438276	0.09854118	0.66256404	0.7099992	0.51061374	0.85963285	0.4763281
r2	0.96605754	0.016466757	0.98510057	0.9610366	0.98223954	0.92262095	0.97929007
rmse	0.7976993	0.061251257	0.8139804	0.84261453	0.7145724	0.92716384	0.6901653

Slot "leaderboard":

	model_id	mean_per_class_error	logloss	rmse	mse
1	XRT_0_AutoML_20190429_093957	0.3202899	4.770575	0.7227303	0.5223391
2	GBM_grid_0_AutoML_20190429_093957_model_8	0.3422705	1.749438	0.6714478	0.4508422
3	DRF_0_AutoML_20190429_093957	0.3975845	5.859866	0.7340869	0.5388836
4	GBM_grid_0_AutoML_20190429_093957_model_10	0.4062802	2.415437	0.8929760	0.7974061
5	GBM_grid_0_AutoML_20190429_093957_model_0	0.4084541	2.722078	0.6697797	0.4486049
6	GBM_grid_0_AutoML_20190429_093957_model_11	0.4352657	2.143427	0.8003761	0.6406019

Figure 2: Model elaborated through the H2o algorithm.

Next, cross-validation employing a multilayer perceptron was conducted to further investigate the factors influencing the prior ICT training of the analyzed teachers (see Figure 3). The LIME algorithm was utilized to demonstrate that "age" is the most significant factor affecting whether teachers receive ICT training. Following this, aspects related to digital security, information and information literacy, and teaching experience were identified in descending order of impact.

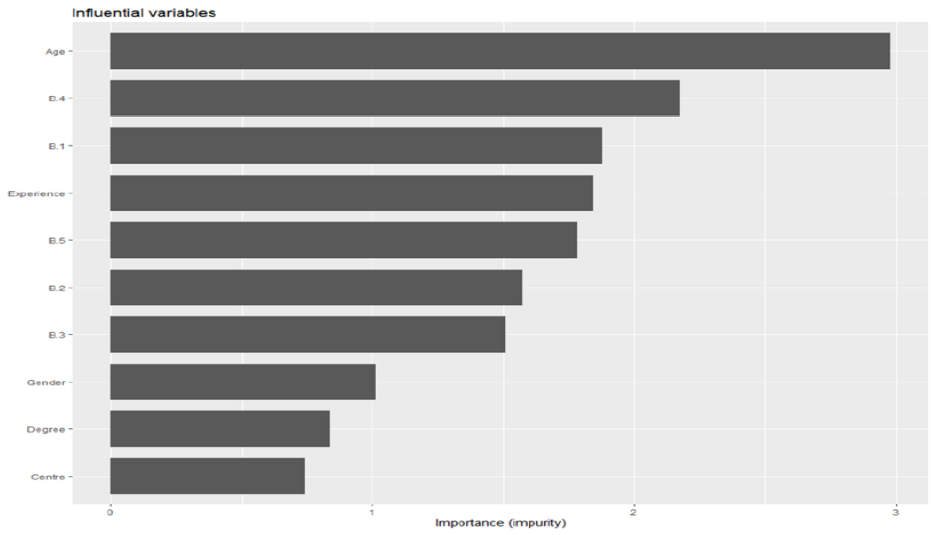


Figure 3: Variables affecting previous ICT training.

The study performed with the LIME algorithm allowed us to discern the variables that most significantly influenced the development of the prior prediction model (refer to Figure 4). Participants exhibiting high proficiency in B.3 and possessing a minimum of ten years of teaching experience were identified as the most significant contributors to the "previous ICT training" variable. Additional relevant indicators were educators aged 33 to 37 and those with a robust comprehension of B.1. Conversely, educators who scored fewer than 56 points in the B.4 category were shown to contribute minimally to this characteristic. This analysis elucidates the complex interconnections among many elements and their influence on the previous ICT training of instructors.

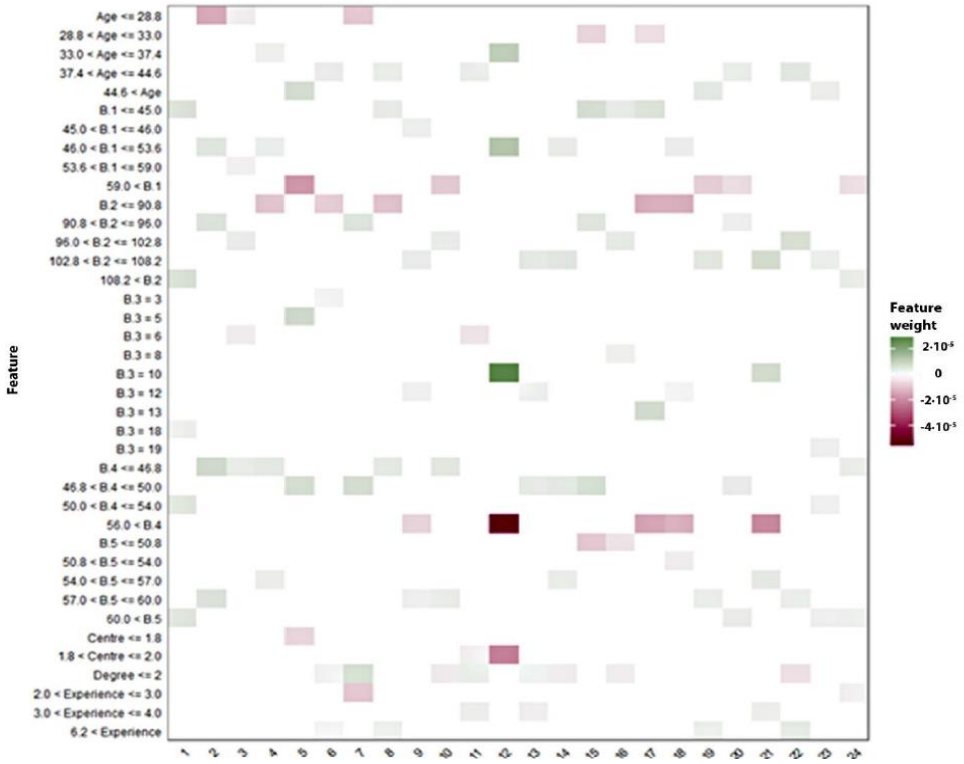


Figure 4: LIME for the variable previous training in ICTs.

DISCUSSION

The enhancement of digital teaching proficiency is a significant challenge confronting our education system today. This issue is notably significant in the realm of Lifelong Learning, where it is clear that educators continue to demonstrate substantial inadequacies in the many competencies necessary for proficient digital instruction. These deficiencies require a sustained dedication to promoting both initial and ongoing training for educators in this crucial domain. Thus, the necessity for enhanced digital teaching proficiency is a prevalent issue that encompasses all educational stages and levels.

The results of the current study highlight a concerning trend: the teaching staff exhibits a generally low degree of digital competence. Indeed, none of the specific variables of digital competence attained optimal performance, underscoring a recurring problem that reflects findings from other educational tiers【33, 34】. This development raises considerable issues regarding educators' capacity to successfully incorporate digital technologies and resources into their pedagogical practices. Among the different parameters evaluated, the domain of digital content creation is notably concerning, as it neared a score of zero. This low competency level indicates that educators are predominantly employing Information and Communication

Technologies (ICTs) solely as auxiliary tools, rather than maximizing their potential.

Implication:

The ramifications of these results are extensive. Educators that possess insufficient self-efficacy to develop and disseminate their own digital content are improbable to engage their pupils effectively within the digital learning environment. The capacity to generate and organize digital information is vital in a technology-driven environment, where students anticipate learning experiences that are engaging, interactive, and pertinent to their lives. Educators lacking the ability to create their own digital materials may find it challenging to engage students or deliver significant learning experiences that cultivate critical thinking and problem-solving abilities. Furthermore, the inadequate levels of digital competence identified in this study may hinder the adoption of novel pedagogical techniques that could improve learning outcomes. Active learning approaches, which depend significantly on the proficient use of digital tools, cannot be completely actualized if educators lack the requisite skills to create and implement such experiences. This situation presents a considerable obstacle to educational advancement and modernization, as it restricts instructors' ability to adopt innovative pedagogical methods crucial for cultivating 21st-century skills in pupils. To tackle these difficulties, it is essential that education systems emphasize the professional development of teachers in digital competence. This necessitates a comprehensive strategy that includes both initial teacher education and continuous professional development opportunities. Equipping educators with the necessary abilities to traverse the digital realm empowers them to develop engaging and relevant learning experiences that resonate with contemporary learners. Educational institutions must prioritize cultivating a collaborative culture among educators, facilitating the exchange of best practices and resources pertinent to digital content creation and ICT integration. This collaborative environment can act as a catalyst for professional development and innovation, enabling instructors to learn from one other and collectively improve their digital skills.

The objective is to develop a generation of educators that are both adept in technology and assured in their capacity to generate and execute digital content that enhances the learning experience. By rectifying the deficiencies in digital pedagogical proficiency, we can guarantee that educators are adequately equipped to address the dynamic requirements of their students in an increasingly transformative educational environment. The enhancement of digital teaching ability is a pressing concern that necessitates immediate focus across all educational levels, especially in Lifelong Learning. This study's findings indicate a troubling deficiency in digital competency among instructors, underscoring the necessity for extensive training and assistance. It is imperative to prioritize the improvement of teachers' digital competencies to cultivate an educational environment that is innovative and sensitive to the demands of learners in the digital era. This initiative will assist educators and empower students to excel in a technology-driven environment, hence enhancing the efficacy and relevance of the educational system.

CONCLUSIONS

The enhancement of digital teaching proficiency continues to provide a considerable challenge for the education system to address. In the contemporary digital era, society increasingly anticipates that educators will possess the digital competencies to successfully convey knowledge to students of all ages and educational tiers. Students in the Lifelong Learning sector are of particular significance among these categories. This group comprises adults with limited exposure to technical resources throughout their formative years, rendering their integration

into the digital ecosystem significantly more challenging. Consequently, it is imperative for educational institutions to prioritize the development of digital teaching competencies. This should entail augmenting continuous professional development for existing educators while simultaneously refining the initial training programs for prospective teachers. Meeting this necessity is crucial; it is the sole feasible route to affecting a significant revolution in teaching and learning methodologies.

This study seeks to elucidate the challenges encountered by Lifelong Learning instructors, emphasizing the significance of this educational phase for the research community and underscoring its pressing requirements. The results demonstrate that educators persistently encounter considerable difficulties in forming an authentic rapport with Information and Communication Technologies (ICTs). The study aimed to elucidate that previous ICT training for teachers did not substantially impact their total digital competence, with the exception of their capacity to generate unique content. This indicates that current ICT training programs necessitate significant improvement to augment the digital competence exhibited by educators. Enhancing digital teaching ability is essential for both the professional advancement of educators and the effective incorporation of technology into educational methodologies. By rectifying deficiencies in training and assistance, we may more effectively prepare Lifelong Learning educators to engage with their students in the contemporary digital landscape. This collaborative initiative will enhance the experiences of instructors and adult learners, facilitating their success in a progressively digital environment.

Information and Information Literacy	Identify, locate, obtain, store, organize, and analyze digital information, data, and digital content, which assess their purpose and relevance to teaching tasks
Communication and Collaboration	Communicate in digital environments, share resources through online tools, connect and collaborate with others through digital tools, interact and participate in communities and networks, which all lead to cross-cultural awareness
Digital Content Creation	Create and edit new digital content, integrate and rework previous knowledge and content, create artistic productions, multimedia content and computer programming, to know how to apply intellectual property rights and licenses for use
Security	Acknowledge protection of information and personal data, protection of digital identity, protection of digital content, as well as security measures and a responsible and safe use of technology
Problem Solving	Identify needs to use digital resources, make informed decisions about the most appropriate digital tools according to the purpose or need, solve conceptual problems through digital media, use technologies creatively, solve technical problems, and update their own competence and that of others

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