INCREASING THE DELIVERY OF DIGITAL SKILLS INSTRUCTION IN MEDICAL COLLEGES: A DETAILED ANALYSIS

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ABSTRACT:
With COVID-19 approaching, higher education's pressing need for professors proficient in technology has grown. While institutional structures and initiatives exist, insufficient scientific literature exists to describe them. Medical Colleges have introduced various measures to assist teachers in developing this level of competency in digital teaching. This study examines the traits and outcomes of instructional approaches for enhancing digital teaching proficiency in a Medical College setting. Using the PRISMA technique, the literature was thoroughly evaluated in the primary databases.

Following the filtering stages, 20 papers out of 322 were analysed thoroughly. According to the findings, these tactics primarily impact things like professional competence and the use of technology during the training process. Similarly, most approaches rely on solitary activities like courses or workshops, while collaborative, experiential, and reflection-based procedures are beginning to emerge, features that teachers strongly value. In light of the preceding, it becomes clear that it takes more than one-off initiatives to improve teachers' digital literacy and foster a genuine digital transformation.

Keywords: Digital competency, Constant learning, Medical College Instructor, Systematic review.

INTRODUCTION:
Over the past ten years, most medical education institutions have prioritized digital transformation. Many studies outline the difficulties that this transformation brings about, but one that stands out is

the requirement for teachers to be proficient with digital tools. The COVID-19 pandemic-related events have contributed to accelerating digitization processes in educational institutions; many lacked strategic plans or models for integrating technology into the classroom, further aggravating this reality. Teachers were forced to shift rapidly to digital education without planning or preparation due to the remote learning emergency (Cook et al., 2023).

They faced several difficulties, the most significant of which were their lack of technological know-how, difficulty adjusting to digital content, and ignorance of digital pedagogies. Numerous national and international agencies have worked to establish frameworks and models so that both people and teachers can develop their digital competence. This has been done in light of the requirement for Medical College professors to achieve a sufficient level of competence in digital teaching. The DigComp and DigCompEdu frameworks, created by the Joint Research Center of the European Commission, are some of the most well-known examples (Moloney & Farley, 2015).

A reference framework for digitally literate individuals, the DigComp framework, currently in version 2.1, identifies the following 5 areas: (1) information and data literacy, (2) communication and cooperation, (3) the creation of digital content, (4) security, and (5) problem-solving. The DigCompEdu framework, on the other hand, is tailored specifically for educators and identifies six areas: (1) professional engagement, (2) digital content, (3) teaching and learning, (4) evaluation and feedback, (5) student empowerment, and (6) student digital competence development. Although DigCompEdu is not a framework created specifically for the Medical College community and does not consider some elements typical of the higher education phase, research has emerged in recent years that use it as a reference at the College level (Kure et al., 2023).

It should be noted, however, that studies in this area are still in their early stages. Each institution has considered its ways to attain it as Medical Colleges move to a digitized reality, and this process has been and continues to be varied. As these authors note, some Medical Colleges have support services and programs for the digital training of their teaching staff, concentrating on subjects like digital identity and well-being, I.T. literacy, digital learning, and productivity. One such Medical College is the Catholic Medical College of Leuven (2015). Others, like Aalborg Medical College in 2018 or the Medical College of Rawalpindi in 2019, have created digital training programs for their teaching staff using automated techniques, online courses, or evaluation tools (Ferrari, 2012).

There are various techniques for developing digital teaching abilities, from more established or conventional methods like courses or workshops to cutting-edge online collaborative methods built on active learning. Institutional strategies are required in this area that go beyond teacher education and incorporate the various factors influencing the growth of teachers' digital competence, such as culture and institutional policies, infrastructure, organizational communication, incentives, and training strategies (Røkenes & Krumsvik, 2014).

Although there are conceptual frameworks and institutional initiatives on digital competence and digital teaching competence, there is still a lack of sufficient scientific literature that specifically describes these training strategies and their main outcomes in the College context. Using this context as a starting point, this research is suggested through a thorough literature analysis that explores the most recent developments in the growth of digital teaching expertise in the Medical College setting (Levitt et al., 2016).

APPROACH:

The purpose of this review is to discuss how digital teaching competency is being developed in the setting of Medical Colleges, or rather to give a general overview of the methods and actions Medical Colleges take to foster this competence (Ali et al., 2020). This project poses three research topics to accomplish this goal:

What aspects of teachers' digital competence are most impacted by digital teacher education programs and initiatives?

What training programs and initiatives are Medical Colleges using to increase the teaching staff's proficiency in digital teaching?

What key outcomes were attained due to the adoption of digital training tactics and techniques for Medical College instructors?

The systematic literature review method, which is described as a systematic process that allows the building of a theory through the study of important and pertinent sources in a certain field of knowledge, was chosen to address these three problems. Below is a description of the steps taken to collect the corpus of knowledge based on a series of searches in specialist databases relevant to the issue under study (Cham et al., 2022).

PROCEDURE:

The PRISMA declaration criteria were considered to provide the most effective and moral research that can be traced and whose validity can be assured. The method "digital competence" OR "digital literacy" AND "Medical College lecturer*" OR "professor*" OR "teaching staff" AND (coaching OR training OR development), with no time limit (it was not deemed necessary since it was a relatively recent topic), returns results from the documents examined (Van Laar et al., 2017).

The Web of Science (WoS), Scopus, and Educational Resources Information Centre (ERIC) databases—regarded as the three most pertinent in global education—have all used this technique. The flowchart outlining the processes used during the document selection process is shown in Figure 1.
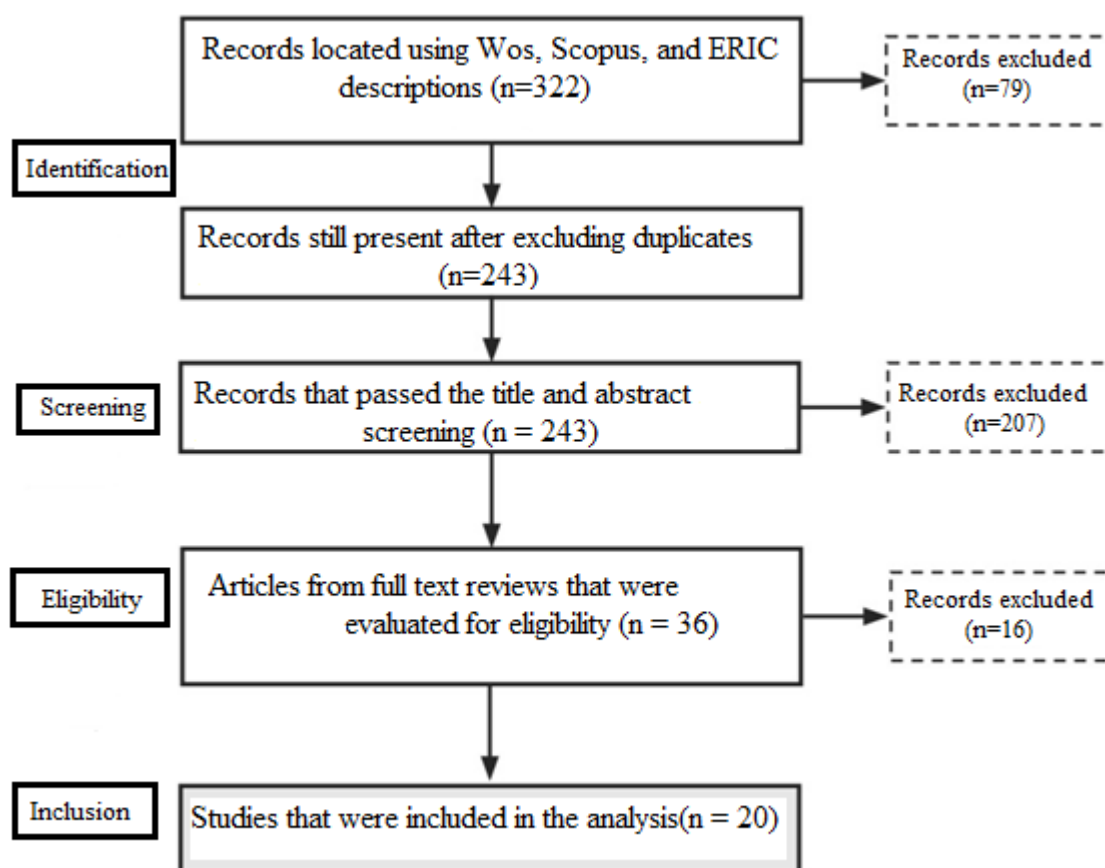

Figure : Phase flow diagram for the PRISMA model.

In the initial identification round, 322 documents were collected and downloaded into a shared database for inspection using Zotero's document manager. Seventy-nine of the total were automatically removed because they were duplicates. Three investigators assessed 243 titles and abstracts as part of the screening phase, using the previously established inclusion and exclusion criteria listed in Table 1 and accessibility standards. Researchers were marked as "Maybe", and their concerns regarding exclusion or inclusion were discussed with the other researchers. Thirty-six

articles were left for full-text review after 207 records were removed after titles and abstracts were reviewed (Palacios-Rodríguez et al., 2022).

Following this analysis, 16 were eliminated, leaving 20 articles for in-depth research. The articles were reviewed using MAXQDA analysis software (2018 release), with the three researchers working together in iterative coding processes. The initial categorization system was created based on the research questions. It included the author, year, and country of the article, the methodological approach (theoretical, qualitative, quantitative, or mixed), the developed digital teaching competence area, the training strategy, and the results. The content evaluation revealed new codes, which were incorporated into the analysis. The code was then exported to a spreadsheet where the snippets could be examined, rearranged, and examined (Røkenes, 2016).

Table 1: Review the Inclusion and Exclusion Criteria.	
Criteria for Inclusion	**Exclusion Standards**
Centred on teachers' digital literacy or proficiency	not concentrating on the teacher or digital literacy
Higher education-related	applied to various levels of education
Contains a suggestion for improving digital competency.	It doesn't include a recommendation for enhancing digital competency.
Written in Italian, Portuguese, Spanish, Catalan, or English	published in foreign languages

SAMPLE ANALYZED:

The sources used in the analysis are listed in Table 2. As can be seen, ten documents relate to countries in Europe, six to those in America, three to those in Asia or Eastern Europe, and one to those in Oceania. On a methodological level, 11 papers provide a qualitative approach, three are quantitative, and two are mixed. Four articles are theoretical (Reddy et al., 2023).

No.	Authors	Year	Country	Method
	Table 2: Lists the Paper's Identification Information and Methodology			
1.	Kohler et al.	2019	Germany	Qualitative
2.	Guri Rosenblit	2018	Israel	Theoretical
3.	Infante-Moro et al.	2020	Spain	Qualitative
4.	Keller and Hrastinski	2007	Sweden	Qualitative
5.	Kholina et al.	2020	Rusia	Quantitative
6.	Kullaslahti et al.	2019	Finland	Qualitative
7.	Lamond and Rowlett	2019	New Zealand	Qualitative
8.	Martinez and Torres	2017	Mexico	Qualitative
9.	Nascimbeni et al.	2019	Spain	Qualitative
10.	Tejada and Pozos	2018	Spain	Qualitative
11.	Basantes-Andrade et al.	2020	Ecuador	Mixed
12.	Bastide-Bastide	2019	Mexico	Qualitative
13.	Chou et al.	2017	Cuba	Qualitative
14.	Paulo	2019	Brazil	Theoretical
15.	Denisova et al.	2020	Rusia	Quantitative
16.	Guayara-Cuéllar et al.	2019	Colombia	Mixed
17.	Palacios et al.	2020	Spain	Theoretical
18.	Perez-Sanchez et al.	2017	Spain	Quantitative
19.	Raita et al.	2019	Finland	Qualitative
20.	Saalman	2011	Sweden	Theoretical

Figure 2 depicts the distribution of articles from a temporal viewpoint, highlighting the last four years (2017, 2018, 2019 and 2020) as having the highest production concentration.
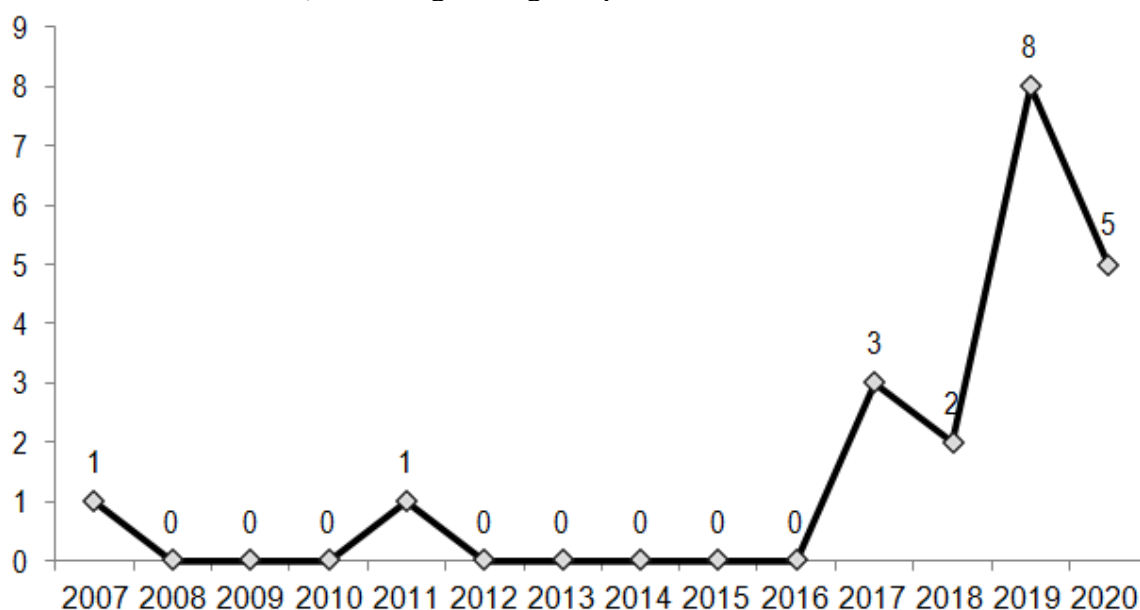

Figure 2: The investigated papers' temporal distribution

RESULTS :

The key findings regarding the three study issues are discussed in light of the extensive examination of the 20 studies mentioned above.

Areas of knowledge for digital teachers where digital teacher education tactics and initiatives have the biggest influence

To respond to the first research question, we now examine which digital competency frameworks and models are offered in the examined papers. After conducting a systematic examination of the literature, Table 3 shows that up to 6 different applicable frameworks have been found, along with some that have not been defined or developed on the fly for research (Casno & Sloka, 2021).

The list includes studies that make use of the following frameworks: (1) frameworks specific to citizens' digital competence (not specifically tailored to the teaching function); (2) frameworks specific to the field of education generally; (3) frameworks that strike a balance between teachers and citizens; and (4) frameworks specific to higher education. As can be observed, the most frequently used frameworks are both DigCompEdu (n=3) and DigComp (n=3), and the majority of publications either do not declare the framework or use an ad-hoc one as a reference (Weke, 2018).

Knowing the knowledge, abilities, and attitudes that have a greater or smaller impact on the plans and activities created by Medical Colleges is vital, in addition to knowing the reference framework. On the one hand, the most repeated abilities are those that have to do with instructors' professional dedication and their use of digital technology during teaching-learning processes (Childs & NM, 2001; Souleles et al., 2022).

Table 3: Relationship Chart of the Studied Articles, Frameworks, and Digital Competency Models	
Platform / Model	**Articles that refer to it**
DigComp (Carretero et al., 2017)	Basantes-Andrade et al. (2020) Denisova et al. (2020) Perez et al. (2017)
I.C.T. Competences for Teachers (UNESCO, 2008)	Chou et al. (2017)
DigCompEdu (Redecker and Punie, 2017)	Kullaslahti et al. (2019) Nascimbeni et al. (2019) Raita et al. (2019)
Critical Rational (E.T.S., 2009)	Guri-Rosenblit (2018)
Peer to Peer and Web-based self-assessment of teacher education technical skills (Põldoja et al., 2011)	Palacios et al. (2020)
Not if you describe/model ad-hoc	Bastida-Bastida (2019) FromPaulo (2019) Guayara-Cuéllar et al. (2019) Infante-Moro et al. (2020) Keller and Hrastinski (2007) Kholina et al. (2020) Lamond and Rowatt (2019) Martínez and Torres (2017) Saalman (2011) Roof and Wells (2018)
Technology-Enhanced-Learning (TEL) and Technology-Enhanced-Teaching (TET) (Köhler et al., 2018)	Kohler et al. (2019)

The former relates to using digital technologies to enhance professional interaction and teamwork to enhance work output. For instance, a proposal based on a system of 101 instructor badges, where 27 of the badges address challenges linked to this digital competence area, intends to develop abilities particular to that competency. The second, which deals with the educational process, focuses on incorporating and using digital technology in educational contexts to encourage students to learn collaboratively and independently, with the instructor assuming the role of guide and offering support (Sharma, 2022).

In the essay, for instance, it is clear that the stages of integrating digital teaching skills for Medical College professors and the teaching units required are proposed. 'Developing and conducting face-to-face and online collaborative learning experiences' is the topic of one of these units. On the other hand, topics pertaining to improving students' digital literacy and empowerment are given less consideration in the publications examined. To help you understand, the first part relating to students' digital competence is focused on the teacher's activities and actions to support students' growth of their digital competence (Oung et al., 2021).

It should be emphasized that just 1 out of 101 badges in this case specifically address it, even though authors include it among the topics their badges focus on. Regarding the second point, student empowerment, some authors stress the significance of tailoring instruction to each student's unique requirements through an online course and a hackathon. Finally, it should be noted that some research has addressed other more specific competencies, such as innovation or encouraging students' creativity and inspiration in digital environments, in addition to these aspects are typically part of the different areas or dimensions of digital teaching competence (Spanakis et al., 2022).

Strategies and training initiatives used by Medical Colleges to increase the teaching staff's proficiency in digital instruction.

The second question we are attempting to address relates to the methods and training procedures used to improve instructors' digital skills. An in-depth examination of the records revealed that several studies under consideration had training proposals. Still, they were either merely theoretical or

provided only a cursory description of the acts and their attributes. Papers with developed suggestions can be divided into two main categories: (1) those that present more traditional ways of expository teaching and (2) developing or exploratory proposals that present non-traditional approaches based on active and collaborative processes (Marin et al., 2021).

Regarding the solutions that take a more conventional training approach, they are delivered through courses and exposition seminars that can be attended in person or virtually.

The reflection on teaching practice, included in numerous proposals as a crucial component of the training process, stands out among the new methodologies. In this regard, for instance, they suggest it as one of the training proposal's main axis, requiring participants to complete reflective tasks to pass the program. For this, blogs make each session's reflections available to the public. A question guide is used as the basis for individual reflection on teaching practice during the first training session (Kwiatkowska & Wiśniewska-Nogaj, 2022).

It suggests including questions at the course's conclusion to let participants reflect on the steps they've taken, the knowledge they've used, and their professional progress. Offers sharing through meetings where personal experiences and thoughts are exchanged with those of other colleagues, providing shared reflections and individual contemplation. Suggestion: Along with ethics and lifelong learning, teacher reflection in and for action should be incorporated as a cross-cutting component of teacher professional development (Bernacki et al., 2020).

Collaboration is yet another tactic that is frequently mentioned. These suggestions for teacher collaboration include: (1) developing learning and research communities, such as those suggested; (2) setting up networks for collaborative work; or (3) engaging in group projects. In this regard, the suggestion to establish a setting for small-group collaboration and knowledge co-construction in common workspaces stands out. They suggest setting up hackathons that combine instruction with cooperative working techniques to foster encounters with group invention (Nadolska & Konovalenko, 2020).

The construction of portfolios, case studies or other problem-based learning modalities, active participation workshops, or practical seminars focused on visualization, simulations, and semantic effect are just a few suggestions for tactics that have been tested and have practical applicability. Several methods are used regarding the teaching staff's first training, which is the centre of the recommendations that were studied. Tejada and Pozos' (2018) suggestion is one of the ones that offer a longer-term perspective. The integration of digital competence teaching is portrayed as an ongoing process that must be practice-focused, adaptable, and appropriate for the teacher's stage in life (Nadolska & Konovalenko, 2020; Salīte et al., 2020).

For instance, a strategy that combines training and work is suggested for the beginning phases of training. In contrast, applying tailored training courses is suggested for the later training phases, working with mentoring and coaching tactics. The author's proposal is another one that highlights the necessity to distinguish between initial training and ongoing training. However, it should be highlighted that most of the techniques studied offer teacher-only training initiatives (Suprapto et al., 2020).

Only one of the plans also aims to train pedagogical trainers or planners. At the same time, another proposal also has an institutional focus, including training for teachers and library employees and a communication strategy. In this situation, a suggestion that calls for an institutional shift toward teaching-learning models common to the knowledge society (such as networks, personal learning environments, mobile learning, gamification, or flipped classrooms) is also made. Most virtual activities use learning management systems, with Moodle and Ping Pong standing out (Powell et al., 2020).

There aren't many ideas that list specific tools together with a discussion of how they might be used in practice. One of these studies is where tools like Rubistar, Padlet, SurveyMonkey, Canva, Blogger, and others support the various phases of its 5E approach (engage, explore, explain, elaborate, and evaluate) shine out. Another idea that discusses using particular technologies describes how to use Wikipedia, Socrative, Kahoot, or Padlet to apply the knowledge learned during the training into practice. The certification of talents is a final aspect worth mentioning. In this regard, some

recommendations suggest it as a motivational factor and an element of interest for teachers' professional growth. In this regard, they suggest a digital badge strategy for virtual certification. This project aims to develop and set up a system of national digital badges to acknowledge teachers' professional competence (Krah et al., 2021).

Principal findings following the adoption of digital training tactics and techniques for Medical College professors

While some of the reviewed publications do not include actual data following the deployment or validation of their strategies to increase Medical College teachers' proficiency in digital teaching, most do. Following their analysis, we may categorize them into three categories: (1) perceived utility; (2) the effectiveness of enhancing teachers' digital competence; and (3) other pertinent factors to emphasize. To respond to the third research question, they will be discussed below.

On the one hand, some research focuses on evaluating the participants' perceptions of usefulness, likeability, and level of satisfaction with the ideas. For instance, they examine and confirm a thorough assessment of the specified course and the accomplishment of its goals. They demonstrate the high participant motivation for creating the pilot courses in nano-MOOC format, highlighting the value participants perceived in the resources and materials as a source of inspiration to innovate in their teaching practices (Fleischmann et al., 2020).

These findings are similar to those proposed, highlighting the participants' propensity for innovation. The active and collaborative course design and the sense that the knowledge obtained will be valuable for one's professional performance stand out as favourable characteristics of the EduHack courses presented. On the other hand, some studies highlight less than positive aspects, such as the one from which, despite obtaining positive results regarding the use of specific teaching-learning environments in terms of usability and profound reflection, shows that these platforms were not a good tool for comparison and interaction, highlighting the fact that communication is also an important factor in educational courses in addition to content (Morris, 2019).

However, as we mentioned at the beginning of this section, additional research has concentrated on the efficacy of the techniques and actions used to enhance the digital teaching proficiency of Medical College teachers. According to some studies, using digital tools in teaching practice will result in improved attitudes and higher perceived self-efficacy. As in the example, which has demonstrated an improvement in teachers' abilities and awareness of cybersecurity concerns and increased the digital culture of the classroom, other tactics and activities directly enhance teachers' digital competence (Tang et al., 2019).

Additionally, they demonstrate how participants observed improvements in their digital competencies and capability to apply digital technologies in teaching and how participants feel more capable after completing the suggested training seminars. Similar to how other authors have confirmed, working on digital teaching competency in all domains and sub-areas thoroughly has not only allowed for a better understanding of this competence. Still, it has also allowed for a greater understanding of its relevance and the ability to self-evaluate and detect any training deficiencies (Romero-García et al., 2020).

Final thoughts Other findings and problems highlighted by the results were also addressed, in addition to examining the effects of these methods and activities on satisfaction and perceived utility or reviewing the effectiveness of the ideas. On the one hand, it is important to recognize the complexity of digital teacher education, which results from, among other things, the disparities in the experience and pace of learning of the participating instructors and the existence of many generations of educators with their unique expectations. In this way, they emphasize the crucial role of the institution, which goes beyond simply providing the resources required for teacher education. Participants perceive institutional support as a key institution-wide strategy, which raises the motivation and dedication of the teaching staff (Drydakis, 2022; Malykhin et al., 2022).

Regarding teacher preparation, several authors have emphasized the value of and gap in current teacher didactic preparation. Teachers need to focus more on developing learning objects, encouraging collaboration, and building learning communities since digital competence extends far beyond the technical use of tools. For this, it is crucial to strengthen teacher training programs and

centres from a digital vision and culture, both in initial teacher preparation and continuing education, as well as to rethink institutional strategies in a broader sense, with sufficient incentives (economic and recognition of work in digital teaching) and pedagogical and technological support services for teachers (Weke, 2018).

DISCUSSION AND CONCLUSIONS:

Digital competence has grown in importance and relevance in the academic context in recent years, generally and specifically concerning the educational profession. The literature review reveals that there have been more publications on this subject since 2016 than there were. Since 2014, databases have shown an upsurge in this topic, and while most publications addressing it are of European provenance, we are seeing more and more studies in various international contexts (Spanakis et al., 2022).

Regarding the first research question, and going back to the main topic of this article, the development of digital teaching competence for Medical College teachers, it can be said that there is a certain disparity in the frameworks and models used as a guide in digital training strategies. Similarly, many documents have been discovered that expressly rely their interventions on an ad-hoc model they have built rather than making any reference to a reference framework, such or. In reality, among the models examined in this research, this is the only one built especially for the teaching field in higher education, as the others are adaptations from earlier educational levels. The DigComp and DigCompEdu frameworks, which appear to have become standards in recent years, are among the most frequent, as shown (Rodrigues et al., 2021).

Regarding the topics covered in training tactics and activities, those that centre on or affect the learners typically take a backseat. Those that encourage the growth of the student body's digital literacy and the use of technology for their empowerment. These results align with the literature on the levels of growth of Medical College teachers in these two domains; in certain situations, in addition to having lower skill levels, they also lack clarity regarding their roles and duties (Petrović et al., 2022).

In response to the second study question, this analysis discovered a variety of novel and diverse approaches, like establishing a play area for technological experimentation at a Medical College in New Zealand, hackathons or group innovation experiences in Spain, or digital badge certifications in Finland. Beyond the fact that more conventional or novel approaches are presented, the majority of the proposals, it seems, are closer to isolated and generic actions than to long-term professional development strategies, which, according to various authors, are thought to be necessary to produce changes that have an impact on practice and endure over time (Rudolf, 2023).

However, because skill development is inherently difficult, it is important to include approaches beyond merely exposing students to information and take a more constructivist and collaborative approach. Surprisingly, only a few proposals take the context in which the teaching staff is immersed into account, either by placing it at the centre of the training experience or by at least attempting to facilitate the subsequent transmission of knowledge to practice. This is true even when considering the situational component of the skills. There is still more to be done in this regard. Thus it is vital to reevaluate the recommendations from a placed and applied perspective, considering the elements of the particular teaching environment and practice where teachers will apply their digital teaching skills. Regarding the third study issue, we can see several surveys that aim to examine how satisfied people are with or think the suggestions for increasing digital teaching competence are useful. In this regard, the study has emphasized the significance of courses that teachers find interesting and have cooperation and communication methods in addition to properly prepared course materials. These results are consistent with earlier studies emphasizing the advantages and benefits of collaborative teaching-learning platforms over alternative methodologies and resources. On the other hand, some of the research examined concentrated primarily on the effectiveness of the proposals, highlighting that frequently these kinds of strategies and actions improve the teacher's perceived self-efficacy, knowledge, and the importance given to this competence, all of which will undoubtedly need to be explored in greater detail in future research (Jami Pour et al., 2021).

As a result, in keeping with what was previously said, this review gives us access to a theoretical corpus that can be used to determine which digital teaching competencies we work most closely with teachers, what Medical Colleges are doing to train their professionals, and what outcomes they see as a result of these institutional initiatives. As a result, since information is obtained about what is done in that context and what results are delivered, this work can be helpful for individuals who want to create a teacher education strategy in digital teacher competency in a Medical College environment (Mohamed et al., 2006).

It's crucial to remember that this research has some limitations typical of work with these qualities. Since there is no one way to characterize digital teacher education, one of the limits is how difficult it is to develop search terms. In this regard, frameworks and models like the previously mentioned DigComp or DigCompEdu, which have become widely used recently, contribute to the continuity and traceability of this type of analysis, limiting or ultimately generating a performative effect. This effect may be interesting to examine in the years to come. On the other hand, given the search criteria and chosen databases, it is highly likely that actions and proposals are being taken in various Medical Colleges that are not included in this type of analysis because they are not documented or are reports and grey literature (Ghazy et al., 2021).

Deepening the literature study and including previously unconsidered examples of digital teacher education practices from different Medical Colleges would make for fascinating areas of future research. This comprehensive literature analysis has demonstrated how difficult the topic of digital teacher education and teacher education in general is and how it frequently receives less attention than other academic disciplines like research. Investigating institutional context and culture elements that support or obstruct these educational processes, such as alignment with Medical College strategy, investments in and accessibility to digital tools and technologies, teacher evaluation policies, and other issues, would also be pertinent (Mora-Gonzalez et al., 2020).

And because of this, Medical Colleges must design and implement adequate strategies to improve teachers' digital competence through policies for the promotion, recognition, and support of teachers, which are essential components in the digital transformation of higher education. These strategies must go beyond the isolated actions of digital training. The contributions of this article in this regard.

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