INTERNATIONAL JOURNAL OF SOCIAL WORK PRACTICE AND ENVIRONMENTAL DEVELOPMENT
Affiliated and Published for University of Kent, Canterbury, Kent, England

Self-perception of Teachers in Training on the Ethics of Digital Teaching Skills: A Look from the TPACK Framework

VOLUME: 7 ISSUE: 2
JUNE, 2026

ISSN: 9473-3482 (Online)
ISSN: 3483-2823 (Print)

Isabel María Gómez-Trigueros
University of Alicante, Spain.

Abstract

The concept of technological pedagogical content knowledge (TPACK) is presented as a framework that guides how to effectively integrate technologies in the educational environment. Through this model, we investigate the ethical implications related to the use of digital tools in teaching, and we outline the necessary knowledge that educators should have to address these issues of ethics and technology in the classroom. We assess the professional, ethical knowledge of pre-service teachers regarding their use of technologies using a descriptive and exploratory mixed-methods approach. The data for this research come from a Likert-scale questionnaire administered to 616 teacher-training students in Spain, as well as from personal interviews with 411 of them. From these data, we identify four of the eight dimensions of ethical knowledge: professional, ethical knowledge, ethics in the use of technologies, pedagogy for their integration in the classroom, and the use of content specific to the disciplines of pre-service teachers. The results obtained indicate that the preparation of educators with professional, ethical knowledge in training is insufficient, which highlights the need to address this issue in the post-pandemic context of the 21st century. Among the difficulties detected, it should be noted that this study is limited to a European university and a sample chosen for convenience, so it would be advisable to extend the study to other European universities.

Keywords: Professional Ethics, Teachers in Training, Teaching Digital Competence, Technology, TPACK.

1. Introduction

Emerging technologies have generated a disruption in teaching and learning processes at all educational levels. In this sense, Generative Artificial Intelligence (GAI) has been one of the significant advances in the technological process and a potential tool that is generating a true revolution at all levels of society, including education. Its development must be analyzed as a complex issue, with many facets and different points of view and assessments (Strom & Viesca, 2021). In addition, the COVID-19 pandemic imposed a new model in the educational field, moving from 100% face-to-face education to virtual or hybrid. This situation has forced the use of technologies as key resources in the teaching process and the incorporation of the Internet and its potential. All this has generated a crisis in the training of citizens and the need to work on ethics in the teaching and learning process by adapting non-face-to-face or semi-face-to-face teaching; rethinking this process by university institutions, teachers, and students (Gómez-Trigueros, 2023; Zhu & Liu, 2020).

The main objective of this research has been to explore the level of knowledge about the ethical aspects that affect teachers. To do so, the ethical dimension has been incorporated into the TPACK model, and an evaluation has been carried out using a questionnaire and personal interviews. These instruments were adapted to the educational context marked by the pandemic and the post-

pandemic, characterized by a bimodal teaching model within a Faculty of Education at a European university. The specific objectives focus on answering the following questions or study variables:

Firstly, teachers should have knowledge of professional teaching ethics (PEK) in training.

Secondly, assess the importance that teachers in training give to professional, ethical knowledge in the use of technologies (PTEK).

Thirdly, analyze the relationships between teacher professional ethical knowledge (PEK), professional technological ethical knowledge (PTEK), and Technological Pedagogical Ethical Knowledge (TEKP) of teachers in training (They are university students who are studying to become primary and secondary education teachers).

Fourthly, the aim is to understand the self-perception of teachers in training regarding the ethical knowledge they have in the use of technologies and theoretical content from pedagogy (PTEKC).

2. Literature Review

It is clear that the pandemic has generated an innovative transformation in the field of education, collaborating in the search for solutions for the training of students during confinement. This situation has made educational institutions aware of the importance of training students in digital skills. Also, deficiencies have been detected in relation to the digital teaching competence of active teachers (Gómez-Trigueros et al., 2021). This circumstance confirms the need for adequate preparation of teachers in different dimensions beyond the knowledge of the content and pedagogical knowledge that Shulman (1986) pointed out. With the widespread use of technologies in education, the teaching process is transformed, and in addition to having content knowledge and pedagogical knowledge, teachers must acquire the skills and knowledge of educational technology to guarantee successful teaching with information and communication technologies (ICT). Thus, the technological pedagogical content knowledge (TPACK) framework emerged, designed by Mishra and Koehler (2006), to represent the knowledge structure of teachers in the era of information technology (Graham, 2011; Schmid et al., 2020). With the undeniable importance of technology in the virtual world, TPACK configures an instructional tool for students who acquire technological skills with the implementation and use of technologies. It also provides teachers with resources to plan strategies to achieve successful learning (Atun & Usta, 2019; Gómez-Trigueros, 2023).

Technology and Ethics in the Educational Process

In the new pandemic and post-pandemic educational context, one of the important issues to consider is how to help teachers train teachers to consider the ethical implications of the inclusion of technologies such as GAI and the Internet in teaching. Ethics as a concept is one of the most important elements in higher education, which is why it is important to analyze the attitude of educators in relation to ethics in the use of digital tools and knowledge.

In the educational context, ethics encompasses much more than interactions between individuals; it becomes a vehicle for the transmission of values, integrating itself as an essential component of the teacher's professionalism. This fosters a sense of commitment and responsibility in their daily work of teaching and learning (Ganote & Longo, 2015). It is called pedagogical ethical knowledge and incorporates the consideration of both rights and obligations throughout teaching, its impact and the consequences derived from appropriate or inappropriate behavior in the educational process, and the knowledge of the ethical inference committed (Gao et al., 2008). This is what has come to be called pedagogical ethical knowledge. This incorporates the consideration of both rights and obligations throughout teaching, their impact, and the consequences derived from appropriate or inappropriate behavior in the educational process, as well as knowledge of the ethical inference committed.

Although many researchers and teachers have focused on ethical considerations regarding the use of Information and Communication Technologies (ICT) and IAG in education, studies tend to focus on analyzing the ways in which these tools are used without delving into how they should be implemented in the classroom. This is no minor issue because teachers must take responsibility for

ethical issues understood as challenges, which can be raised by the use of facial recognition, big data-based learning, artificial intelligence, and new technologies in teaching (Mâță et al., 2022). These new situations will lead to the implementation of different methodological strategies in the classroom and the generation of more differences in the training process (Gómez-Trigueros, 2023).

At an international level, various official documents have been drawn up that establish, at an institutional level, the digital skills that educators must acquire during their training, including the United Nations, Educational, Scientific and Cultural Organization (UNESCO) ICT Competence Framework, the European Framework for Digital Competence for Teachers (DigCompEdu) and the Common Framework for Digital Competence for Teachers of the National Institute for Educational Technology and Teacher Training (INTEF). These frameworks aim to guide the use of technologies for their integration into the educational field. To do so, they offer different training paths that respond to the specific needs of teachers in relation to the effective use of these resources in the classroom. In addition, all these documents highlight the importance of considering the ethical dimension in the application of technological tools (Muammar et al., 2023). and the need to incorporate educational models and strategies with technology from an ethical perspective.

TPACK Model and the Ethics of Educational Technologies

In studies on TPACK and its interaction in the educational field, ethics emerges as a fundamental aspect to consider (Baran & AlZoubi, 2023). Therefore, reflecting on ethical thinking is an integral part of the teaching role, especially when planning access to digital resources. This includes addressing issues such as intellectual property in the use of technologies, validation of information obtained through the Internet, protection of data privacy, and promotion of safe use of digital tools (Asamoah, 2019).

This is why the different dimensions of the TPACK model are affected and included in a reflection on ethics:

> Using content knowledge (CK), the teacher prepares his class session taking into account aspects related to the ethics of the discipline; The teacher will take into account the different authors and the different currents of thought and will not alter these constructs; he will present the definitions and other disciplinary aspects without modifying their original structures; etc., (Boydston, 1988).
>
> Using pedagogical knowledge (PK) and pedagogical content knowledge (CPK), the teacher approaches the class and is able to share knowledge of a subject; he takes into account the diversity of the classroom and, therefore, acts ethically in the way he implements knowledge to his students; the teacher focuses on different methodologies according to the needs of his students, showing his teaching ethics (Maroofi et al., 2023).
>
> Using knowledge of technologies (TK) and in their knowledge for their inclusion in class (TPK), the teacher works in a way without gender biases or prejudices towards certain documentary sources, taking into account the intellectual property of the information hosted on the Internet; positively valuing the diversity of opinions; respecting the safety of students in the use of technologies for learning; etc., (Kadıoğlu-Akbulut et al., 2023).
>
> Using TPACK of the subject, the teacher will select and evaluate those specific technological tools to carry out a correct teaching process and achieve the objectives, taking into account the correct inclusion of digital resources for tutorial processes, their management, and the correct evaluation of learning.

Introducing ethics into the TPACK framework can help address the complex, multifaceted, and situated nature of teachers' knowledge in the 21st century, improving key aspects in the preparation of future teachers (Gómez-Trigueros, 2023).

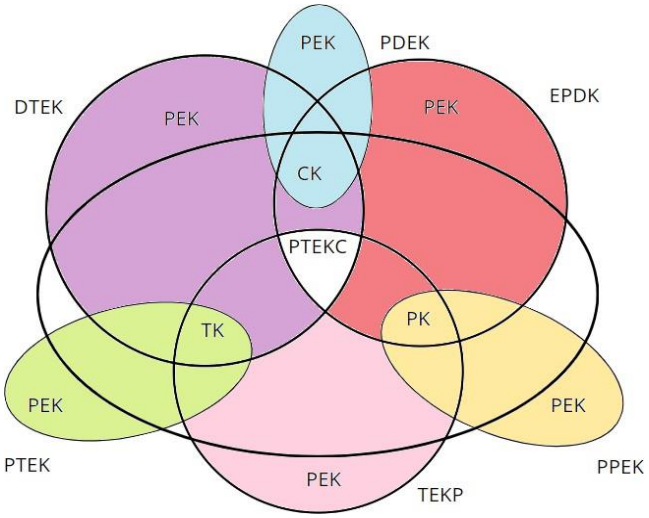

Figure 1. TPACK-ETHICS model

We propose a rethinking of the TPACK construct that includes ethics in all dimensions of the model, as depicted in Figure 1.

We propose a rethinking of the TPACK construct that includes ethics in all dimensions of the model (disciplinary knowledge, pedagogical knowledge and technological knowledge and their combinations) as shown in Figure 1.

Professional Ethical Knowledge (PEK) refers to the teaching and professional responsibility that teachers assume to carry out their tasks. This knowledge includes different aspects related to the commitment to teach in equity and being fair to the student. Also, other outstanding values are added to the teaching profession, such as honesty and empathy with students, with the educational community of which they are part, the documents and information they use, the resources available in educational centers, etc. (Anderson, 2005). These values and virtues of professional ethical knowledge are key to teaching beyond the mere transmission of knowledge and seek to educate citizens (Asamoah, 2019).

Professional Disciplinary Ethical Knowledge (PDEK), which is knowledge about the correct ethical use of the contents of the different subjects to be explained in the classroom. The teaching requires disciplinary knowledge, theories and norms, knowledge, and the scientific advances of each subject. It is, through respect for the ethical codes of the different disciplines, the way in which teachers can ethically teach their students. It is about respecting and valuing the constructs of each discipline without modifications due to prejudices or ideas of the teacher. It is the knowledge that allows the teacher to teach objectively, without manipulating the disciplinary reality, without bias, being impartial in what is known, and transmitting that scientific and academic reality (Asamoah, 2019). Disciplinary ethical knowledge allows the student to learn truthfully without indoctrination from teachers. Thus, training free of influences or manipulations is achieved and, therefore, closer to reality and objectivity, which is, in fact, the objective of education.

Professional Pedagogical Ethical Knowledge (PPEK) is knowledge about the ethical guidelines that teachers must follow in pedagogical teaching practices. This knowledge requires Professional Ethical Knowledge (PEK) and is oriented toward the teacher's task in the classroom. Among other aspects, this knowledge includes the understanding of the responsibilities in the development of different pedagogies, the conscious recognition of the implications of the classroom methodological approach, and the active responsibility to assume the complexity of pedagogical practice (Malone, 2020).

Professional Technological Ethical Knowledge (PTEK), which is the knowledge of the basic rules of ethical use of technologies as a teacher. This knowledge would cover two different areas. On the one hand, the relative to the use of technologies as an educational professional, for example, using authentic digital resources, with recognition and validation regarding the contents they host, citing the authors of the digital data used for the development of activities or the preparation of secondary content; etc. On the other hand, ensure the ethical use of these digital resources by students (Maroofi

et al., 2023).

Disciplinary Technological Ethical Knowledge (DTEK) refers to the ethical use in the creation and management of disciplinary knowledge and information related to those disciplines from the use of technologies; also, how the teacher uses these technologies to publicize the disciplinary content in the classroom and its representation, taking into account the intellectual property of the technological materials of the disciplines; o guaranteeing safe use of technological resources, protecting the privacy of student-users (Carter et al., 2016).

Technological Ethical Knowledge Pedagogical (TEKP) is ethical knowledge in the pedagogical application of general educational technology. It is related to technological ethical knowledge and pedagogical ethical knowledge and refers to the ethical principles that the teacher follows when using technologies in the classroom, how it implements technologies through different classroom strategies, adapting them to the needs of the group to improve learning; to the management of class groups or individual work with technology, protecting students and taking into account the correct ethical use of digital resources, among other aspects (Çelik & Baran, 2022).

Ethical Pedagogical Disciplinary Knowledge (EPDK), which is the ethical knowledge that includes the contents of the subjects, taking into account the pedagogical ethics for each of those specific contents. This knowledge should not be confused with pedagogical ethics or disciplinary ethics as it goes one step further and takes into account the professional and ethical knowledge of the teacher regarding a specific subject and the implementation of a specific pedagogy also from ethics.

Pedagogical Technological Ethical Knowledge of Content (PTEKC) since the very nature of being an educator is subject to duties, responsibilities, and implicit ethical and moral principles. This not only covers professional identity, behavior and conduct (PEK), disciplinary ethical knowledge (PEDK), pedagogical knowledge (PPEK), and professional technological knowledge (PTEK) (Whitehead & Aviles, 2018), but also professional practice is the sum of all these (PTEKC). This knowledge would be the most complex of the entire model and includes knowing the professional ethical principles of the teacher when using technology to teach specific content of a specific discipline or science, being able to ethically implement technology from a pedagogical perspective for specific content, knowing how to create ethical pedagogies with technology to improve student learning in a specific discipline (Figure 1).

3. Methodology

Research Design

The research is contextualized in non-experimental, cross-sectional studies (Hernández-Sampieri & Mendoza, 2018). To carry out this research, an exploratory approach was used, using as main methods a questionnaire to collect data and individual interviews (Pardo et al., 2015). The development of the study was structured in several stages. First, a comprehensive literature review on the Technological, Pedagogical, and Content Knowledge (TPACK) model was conducted, examining previous research on the evaluation of this educational approach, the concept of professional ethics in teaching (including pedagogical ethics and the measurement of ethical knowledge), distance education, and previous studies on Teaching Digital Competence (TDC). Subsequently, research instruments were designed and validated with the collaboration of professors from both national and international universities, experts in the field of pedagogical ethics, and in the TPACK model. For this purpose, the Expert Panel procedure was used, with the intention of improving its effectiveness and relevance; in a third phase, taking into account the recommendations and assessments provided by the specialists, the research team made adjustments to the items of the questionnaire, improving the clarity of the questions, merging some items that were redundant or similar, and perfecting its general structure. Subsequently, data collection was carried out using the questionnaire and interviews as the main research tools. Finally, the data obtained were organized and subjected to a detailed analysis to interpret the results.

Research Context and Participants

The study was carried out over five academic years from the 2019-2020 academic year to the 2023-2024 academic year, in the educational environment of a Faculty of Education belonging to a European university. It is important to note that this research is part of halfway between the pandemic

period in which educational centers had opted for 100% non-face-to-face teaching and, later, with the acceptance of bimodal, blended training.

In the specific case of the university where the research was carried out, student training was provided in a bimodal format. This meant that 50% of the students attended classes in person, while the other 50% participated virtually through the institutional platforms developed for this purpose. This modality was maintained during the first two academic years analyzed. However, in the 2021-2022 academic year, the teaching returned to completely in-person, which allowed face-to-face interviews to be carried out with the research participants. This situation facilitated obtaining direct and qualitative opinions from future teachers, which considerably enriched the findings of the study.

The sample selection for this study was carried out intentionally, following a non-probabilistic criterion. This decision was made based on the researcher's accessibility to the research context and the relevance of the participants in relation to the objectives set out in the study. In total, 616 preservice agreed to participate in the study, distributed between undergraduate students (398) and graduate students (218). The sample is considered to be representative in relation to the total population. Of the total number of participants, 431 are women (70%), with 276 in undergraduate and 155 in graduate studies, while 185 are men (30%), of whom 103 are studying undergraduate and 82 in graduate studies. The ages of the participants range from 19 years to over 40 years (Table 1). The students belonged to the 2nd year of Degree subjects in the subjects of Knowledge of the Environment as compulsory and of the 3rd year the subject of History as compulsory. The Postgraduate students were taking their first year in the subjects of Geography, Innovation in Social Sciences, and Research in Secondary Education with technologies.

Table 1. Sociodemographic Characteristics of the Sample

	Groups			
Gender	2nd Degree	3rd Degree	First-year Postgraduate	Total
W	203	89	139	431
M	86	20	79	185
Total	289	109	218	616

W=women; M=man. Source: self-made

Information Gathering Tools

This research has adopted a mixed methodological approach, combining both quantitative and qualitative methods with a predominantly descriptive approach. Two instruments have been used: a Likert scale questionnaire and a personal, open-response interview. The first of these, the questionnaire, developed specifically for this research and adjusted to its objectives, was based on the previous works of Gómez-Trigueros (2023) and Yurdakul et al. (2012). Its content was subjected to a validation process by specialists from various universities (Table 2).

Table 2. Professional Characteristics of the Expert Group

Professional category	Area of knowledge	Teaching years
Senior Lecturer	General Didactics	14
Senior Lecturer	General Didactics	12
Senior Lecturer	Didactics and School Organization	12
Senior Lecturer	Didactics and School Organization	11
Lecturer	Educational Research and Innovation	12
Lecturer	Educational Research and Innovation	10
Lecturer	Educational Research and Innovation	9

Each specialist was then asked to rate the relevance and functionality of each question using a five-level scale (1, Completely disagree to 5, Completely agree). They were also encouraged to offer recommendations for each of the questions. Based on the observations provided by the specialists, three items were eliminated from the scale due to their similarities in content, while a new item was included as recommended by the experts. The evaluation instrument is composed of 15 questions that are valued on a five-level Likert scale (1, Totally disagree; 2, Disagree; 3, Neutral; 4, Agreement; 5, Totally agree), and is distributed in four categories or analysis variables:

Professional Ethical Knowledge (PEK) (3 items);
Professional Technological Ethical Knowledge (PTEK) (3 items);
Professional Pedagogical Technological Ethical Knowledge (TEKP) (4 items);
Pedagogical Technological Ethical Knowledge of Professional Content (PTEKC) (4 items) (Table 3).

Furthermore, it should be noted that the first three questions (3 items) are sociodemographic and are not part of the instrument prepared. They were included in the development of the research with the intention of knowing if significant differences occur due to gender, age, or other studies.

Table 3. TPACK- Ethics Scale Instrument-Questionnaire

Dimension	Item
PEK	1. I know what ethics and morals are applied to teaching work
	2. I am capable of implementing ethical and moral principles in the classroom with my future students
	3. I know how to act ethically in situations related to teaching and learning
PTEK	4. I know the problems of personal security, copyright, and access to information in the use of technologies
	5. I believe that ICTs allow access to information for all citizens, promoting equity among all
	6. I pay attention to issues related to the copyright of digital sources and make ethical use of information that appears on the Internet
TEKP	7. I am able to guide students to use online educational resources and technologies ethically
	8. I am capable of protecting the right of students to use ICT and Internet knowledge in an ethical manner
	9. I am able to use ICT resources to carry out my task as a future teacher in a safe and respectful manner
	10. I am capable of transmitting ethical values related to the appropriate use of ICT and content hosted on the Internet to my future students
PTEKC	11. I know that I must take into account and respect intellectual property when adapting content hosted on the Internet to create teaching materials
	12. I know the ethical principles regarding the use of digital resources for teaching
	13. I will always use digital content and resources for the classroom that are not sexist, discriminatory or that include violence
	14. I will transmit ethical values and concepts related to justice, truth and respect for diverse opinions

Source: Gómez-Trigueros (2023)

The Cronbach's alpha coefficient (α) of the four dimensions analyzed in this study was used to measure the reliability of the instrument (Raykov & Marcoulides, 2017). McDonald's omega (ω) was also found as a measure of reliability since Cronbach's alpha is considered an insufficient indicator (Schmid et al., 2020). The results obtained in each dimension (PEK $\alpha = .881$; $\omega = .883$; PTEK $\alpha = .884$; $\omega = .886$; TEKP $\alpha = .891$; $\omega = .893$; PTEKC $\alpha = .901$; $\omega = .902$) confirm the existence of a high and adequate internal consistency for each of the dimensions in the proposed study. Similarly, the Pearson Chi-Square test yielded a p-value of <0.001, indicating statistical significance (Cohen et al., 2007), the results reflect a strong relationship between the questions asked, suggesting the robustness of both the items and the structure of the instrument used. As for the second instrument, the interview, it was designed based on the same categories as the first instrument (the questionnaire), but with a different approach in wording to avoid influencing the answers and to ensure that the participants did not receive any guidance (Table 4).

The objective of this interview has been to qualitatively know the responses to those same dimensions from a commented perspective. From the narratives of the participants, we aim to know their reasons for the dimensions of the scale.

Table 4. TPACK-ETHICS Scale Interview Instrument

Dimension	Questions
PEK	Q1. You know what ethics and morals are in teaching work. Prepare a brief definition of these concepts
	Q2. You would know how to act ethically in the classroom. Give an example in which you show that professional ethical behavior in class
PTEK	Q3. You know what copyright is. Prepare a brief definition
	Q4. What problems related to copyright do you think occur with the use of technologies in teaching activities. Give an example
	Q5. When using technologies in the classroom, do you take copyright into account? If so, what ethical measures do you take on this matter?
TEKP	Q6. You think it is important to guide students on the ethical use of technologies. If yes, explain why.
	Q7. How do you think the issue of ethics in the use of technologies should be worked with students?
	Q8. As a future teacher, you believe that you have enough knowledge to make ethical use of technologies in the classroom. If yes, explain how

Table 4. Continue

Dimension	Questions
PTEKC	Q9. Do you consider it important to respect intellectual property when using Internet resources and information to create educational materials? If so, briefly explain why.
	Q10. You think it is important to transmit ethical values as a teacher. If yes, explain how you would transmit values such as truth or justice in class.
	Q11. The contents hosted on the Internet require prior review by the teacher. Do you think you have sufficient professional ethical training to select non-sexist, discriminatory, or violent content? Why?

The second research instrument has also been validated to check the levels of relevance and adequacy, degree of internal coherence, and importance of the construction of the proposed personal questions in the context of the research objectives. In this case, the Delphi method was used (Skulmoski et al., 2007). The experts participating in the validation were the same experts who had participated in the Expert Panel for the first instrument (Table 2). The consistency of the results was achieved after a consensus process, after applying the evaluation instrument in two phases, obtaining statistically solid data. To implement this approach, two teams were created: a coordinating team made up of the study researchers together with those responsible for developing the instrument, and another evaluation group made up of experts. In the analysis, aspects such as relevance and adequacy, internal coherence, and the importance of the topics were evaluated, following the guidelines of Cohen et al. (2007), adapted to the specific objectives of the research. A scale of 1 to 5 points was created for the general assessment of the construct, where 1 implied a low level of compliance with the criterion, and 5 implied excellent satisfaction (Table 5).

Table 5. Descriptive Statistics and Reliability by Element

Relevance	Adequacy			Coherence			Importance		
Q	M	SD	α	M	SD	α	M	SD	α
Q1	4.86	0.292	.912	4.97	0.228	.962	4.90	0.235	.871
Q2	4.93	0.214	.883	4.98	0.256	.913	4.81	0.251	.856
Q3	4.80	0.276	.923	4.84	0.292	.922	4.83	0.210	.905
Q4	4.81	0.283	.871	4.90	0.202	.930	4.80	0.293	.879
Q5	4.82	0.220	.884	4.80	0.211	.911	4.79	0.281	.944
Q6	4.86	0.251	.885	4.81	0.263	.918	4.83	0.222	.920
Q7	4.93	0.263	.897	4.90	0.280	.923	4.86	0.297	.956

Q8	4.90	0.205	.884	4.88	0.219	.896	4.89	0.218	.899
Q9	4.82	0.220	.876	4.95	0.261	.887	4.84	0.294	.914
Q10	4.98	0.212	.887	4.92	0.244	.854	4.91	0.211	.879
Q11	4.93	0.251	.889	4.83	0.292	.875	4.92	0.292	.887

Note: Q= question; M= mean; SD=Standard Deviation; α=Alfa de Cronbach.

In relation to the structure of the personal interview, the final results were obtained after its implementation in a pilot test on a sample greater than 14% (58 students) of our research context (411 participants). It was found that the information gave an average higher than 4.97 in the general assessment of the construct in terms of relevance and adequacy, internal coherence and importance of the questions designed, as well as a low dispersion of the responses (SD≤0.297). Likewise, a general value is obtained in the reliability and internal consistency of the total scale (α = .918); for the relevance and adequacy block, a value close to 0.9 (α = .899); an optimal general value for the internal coherence block of α = .893; and a general value of α = .928 for the importance of the questions raised with respect to the research objectives block. Likewise, the values obtained in each element of the scale are satisfactorily included between α = .854 and α = .962 (Table 5).

In accordance with the general phases of qualitative content analysis defined by Kuckartz (2014), the textual discourses collected after the group interviews were coded and categorized. The coding and categorization procedure was carried out in a comparative manner, reflecting on and taking into account the interpretations generated, and applying the methodological principles of grounded theory (Glaser & Strauss, 1999). In accordance with these principles, the recording units were first compared for their classification into exclusive meaningful categories, derived from the textual data; then, these units were again incorporated into the emerging categories and, finally, the necessary categorical relationships were established to group concepts according to the study dimensions. Secondly, an open coding process of the transcripts was carried out, by which concepts were assigned to the emerging meaning units, by which the codes obtained were grouped and organized, based on their connections, into study variables or subcategories that would explain the analysis categories; and a selective coding process, by which the final categories or subcategories were integrated around the central analysis dimensions (Denzin & Lincoln, 2018). To do so, the approaches evidenced by the scientific literature on the TPACK framework and ethics in initial teacher training were taken into account, and in particular, the approaches identified by Asamoah (2019), "Professional Ethical Knowledge"; by Maroofi et al. (2023):

> "Professional Technological Ethical Knowledge"; and by Çelik and Baran (2022) "Technological Ethical Pedagogical Knowledge". In the third phase, after reading the texts repeatedly, the researchers met on several occasions to organize and agree on the concepts in the study dimensions in a consensual manner. Once defined, an external researcher proceeded to re-code and specify the concepts in the dimensions. Then, in a meeting between the principal researchers and the external researcher, the categories and their incorporation-connection with the study dimensions were agreed upon (Table 7).

Research Development

The process for administering the instrument (questionnaire) was carried out through an online questionnaire, created in the Google Forms application. The sample accessed this questionnaire from September to December of the different academic years analyzed. The students received the questionnaire through their university institutional email and were informed of the objective of the research, as well as the confidentiality of the responses.

Semi-structured personal interviews were conducted. The selection and use of this technique were aimed at obtaining detailed information on the attitudes and perceptions related to the elements of professional ethics, the use of technology, and pedagogy by the participants. This methodology was complemented by the application of a previously mentioned questionnaire, with the aim of generating meanings and deepening the interpretation of the students' individual perceptions (Alhadabi & Karpinski, 2020). The participants were contacted through institutional emails, and the interviews were carried out at the Faculty of Education of the same university, during the third and fourth week

of November of each academic year included in the study. In the first two cycles analyzed (2019-2020 and 2020-2021), the interviews were conducted through Google Meet, while in the last two (2021-2022, 2022-2023 and 2023-2024) they were carried out in person. In both the emails and at the beginning of the interviews, participants were informed of the conditions under which the study would be conducted, the objectives of the research, and the estimated duration of 55 minutes. After the presentation of the purpose, it was emphasized that the data collected would be treated confidentially and anonymously, and interviewees were informed that the sessions would be audio-recorded. In total, 411 students participated out of the 821 recruited (n=821).

To respond to the research objectives, descriptive analysis was carried out (M=means and SD=standard deviation) using a tool called the Statistical Package for Social Sciences (SPSS Statistics) in version 26 for Windows. For the analysis of the qualitative data, the MAXQDA software (v. 2018.2) was used due to its capacity for coding, categorization, information saturation, counting of keywords, and interpretation of the information obtained. In this case, a frequency analysis has been carried out in relation to the specific terminology used by the participants.

4. Findings/Results

Descriptive Analysis

In this section, the results obtained in the implemented questionnaire are presented, starting with the descriptive analysis of the participants' scores considering the items that make them up. The results of the descriptive statistics (M; SD) of each of the dimensions (Table 3) are worth noting. Firstly, it is worth noting the insufficient training of the participants in fundamental concepts related to professional teaching ethics. In the dimension related to Professional Ethical Knowledge (PEK), the results reflect limited or non-existent training and a low preparation to apply ethical principles in the educational field. The responses obtained show averages close to 2 (Disagree) (M≤2.86), with little variability in the responses (SD≤0.69) (Table 6).

Table 6. Descriptive Statistics (M, SD) and Reliability (α, ω) of the Research Questionnaire

Dimension	Item	M	SD	α	ω
PEK	P1.	2.39	0.66	.881	.883
	P2.	2.86	0.68		
	P3.	2.73	0.69		
PTEK	P4.	4.91	0.51	.884	.886
	P5.	4.86	0.49		
	P6.	4.87	0.52		
TEKP	P7.	3.23	0.81	.891	.893
	P8.	3.28	0.92		
	P9.	4.79	0.52		
	P10.	3.19	0.81		
PTEKC	P11.	4.91	0.50	.901	.902
	P12.	3.03	0.88		
	P13.	4.96	0.53		
	P14.	4.97	0.49		

Note: M=mean; SD=Standard Deviation; α= Cronbach's alpha; ω=McDonald's omega

On the contrary, in the Professional Technological Ethical Knowledge (PTEK) dimension (items 4-6), which provides information on the students' self-perception of their ethical knowledge in relation to technologies, the items present values close to 5 (Totally agree) (M≥4.86; SD≤0.52). The values are related to a high assessment by the teacher trainees of ethical aspects related to security in using technological tools (item 4) and the so-called copyright on Internet materials and content (item 6). It is worth highlighting, specifically, of particular note the importance given to ICT resources in the 21st century for social progress (item 5) with an assertive response option towards ICT of Totally agree (M≥4.86; SD ≤0.49).

Regarding the third dimension Technological Pedagogical Ethical Knowledge (TEKP) (items 7-10), the results reflect an unfavourable perception by the participants about their ability, as future teachers, to guide students in the responsible use of technologies (item 7, M=3.23; SD=0.81), in the

protection of their rights (item 8, M=3.28; SD=0.92) and in the transmission of ethical principles in the educational context (item 10, M=3.19; SD=0.81). However, in the same category, positive evaluations are observed that are close to the response option "Totally agree" (5), when asked about their competence to use ICT resources ethically in their teaching role (item 9, M=4.79; SD=0.52). The same happens with respect to the fourth dimension Disciplinary Technological Ethical Knowledge (PTEKC) (items 11-14), where teachers in training indicate that they have sufficient preparation regarding considerations on intellectual property both in content and in digital materials (item 11, M= 4.91; SD=0.50); ability to discriminate non-sexist, discriminatory or violent materials (item 13, M=4.96; SD=0.53) and to transmit, through their teaching practice, ethical principles such as equity, honesty and consideration for different perspectives (item 14, M=4.97; SD=0.49).

The results change completely in the question of the participants' recognition of ethical values when using ICT resources for the educational process (item 12). In this question, the perception of trainee teachers is once again a response to option 3, Neither agree nor disagree (M=3.03) with a high dispersion (SD=0.88).

Qualitative Analysis

Once the content patterns were identified and the available information categorized, the keywords and the frequency of the responses were counted using the MAXQDA computer program. This allowed the percentages of the concomitant textual fragments to be recorded. The analysis concepts are linked to the most representative response texts of each category for the presentation of results.

The qualitative data obtained by MAXQDA (v. 2018.2) yield results converge with those obtained in the quantitative analysis of the questionnaire or first instrument. The notion of professional teaching ethics (PEK) in the use of technologies in the classroom (PTEK; TEKP; PTEKC) is associated with concepts related to the four dimensions created that coincide with the analysis variables and that try to respond to the research objectives, made explicit. If we look at the data in detail, in relation to the first dimension studied (PEK), which includes among the given answers the concepts of: philosophy, philosophize, philosopher, philosopher, A value of the descriptives of low approximation to the variable under study is confirmed (Mo=1; SD=0.79). Specifically, the 351 citations stand out (f=251), which represents 58% of the students, who consider, at the second level of approach, that it is philosophy and philosophers who define the concept of professional ethics (Table 4).

The notion of norm, normative is another of the most recognized concepts. This recognition is linked, at a low level of approximation (f=245; 56%), to the intimate relationship between philosophy and normative aspects as elements that characterize the notion of professional ethics.

Along these lines, in the second dimension (PTEK), the relevance given to respect for copyright is verified; copyright and rights (f=338), security; safe (f=314), protection; protect (f=217) and the concepts of egalitarian; equality; accessibility; access (f=201). These terms represent 83%, 72%, 50% and 46% respectively of students who perceive such terms as defining in relation to the use of technological resources from an ethical dimension (Mo=2; SD=0.71).

In reference to the highest level of approximation (value=3), there is the third dimension (TEKP). The analysis carried out allow us to verify the interpretation given to this knowledge with copyright and authorship (f=399), where 92% of participants refer to it as words to define the use of technology from ethics as teachers. Likewise, safe and secure (f=386) is cited by 90% of teachers in training as a term in the characterization of this dimension. Other important terms used by the participants for this dimension are protection and protect (f=324; 75%) and accessibility, accessible and access (f=145; 34%) (Table 7).

Table 7. Terms for Defining the Dimensions Analyzed from the Interviews

D	Term	f	%	M0	SD
	Philosophy; philosopher; philosopher; philosophize	251	58%		
PEK	Moral; morality; moralist	233	54%	1	0.79
	Rules; normative	245	56%		
	Law; laws; legality; legal	187	44%		

	Copyright; authorship; rights	338	78%		
PTEK	Security; sure	314	72%	2	0.71
	Protection; protect	217	50%		
	Egalitarian; equality; accessibility; access	201	46%		
	Security; sure	386	90%		
TEKP	Protection; protect	324	75%	3	0.52
	Accessibility; accessible; access	145	34%		
	Copyright; copyright; authorship	399	92%		
	Respect	284	57%		
PTEKC	Responsibility; responsible	292	68%	3	0.57
	Diversity; diverse	359	84%		
	Non-violent-sexist-racist resource	348	80%		

Note: D: dimension; f: frequency; Mo: modal value or mode; SD: Standard Deviation

This trend is repeated in the last dimension analyzed (PTEKC), with a high level of approximation (value=3; SD=0.57), and with defining concepts such as: diversity and diverse (f=359;84%); non-violent-sexist-racist resource (f=348;80%); responsibility and responsible (f=292;68%) and respect (f=284;57%).

5. Discussion

After the analyses carried out, it is possible to affirm that pre-service teachers have weak training in ethical teaching knowledge for the use of technologies in the classroom.

This is confirmed when teachers in training are asked if they know concepts about what ethics is and how it is transferred to the classroom as professional teaching ethics (PEK), showing a lack of specific training that highlights the low preparation to apply ethical principles in the educational field. In their narratives and speeches, this lack of preparation on teaching ethics is confirmed, relegating it, as observed in the interviews, to a purely philosophical question and, therefore, an object of philosophers and not of teachers. Along these lines, another of the objectives of this work is to assess the importance that teachers in training give to professional, ethical knowledge in the use of technologies (PTEK); the results obtained indicate the great importance that it represents for them to work safely with technologies in the classroom. This implies the positive recognition of programs and plans on citizen security and teacher training in digital skills (Redecker & Punie, 2017; UNESCO, 2021). Also, the importance of pre-service teachers in respecting copyright on materials and Internet content to be used in the classroom is observed. This attitude towards digital resources shows that copyright policies are working, as shown in the narratives of their speeches where concepts such as "copyright is verified", "copyright and rights", and "protection" appear related to the professional use of technologies.

Another aspect analyzed in this research is the relationships between the professional ethical knowledge of teachers (PEK), professional technological ethical knowledge (PTEK), and their professional use (TEPK) in the classroom. It was found that the participating teachers in training expressed an unfavorable self-perception related to their ability to guide students in the responsible use of technology. This negative self-perception also appears when they are asked about their preparation to transmit ethical principles in the future educational context. This self-perception confirms studies such as those by Asamoah (2019) and Muammar et al. (2023), where a clear relationship is observed between ethics in teaching and issues not linked to technologies but rather to the issue of intellectual property, but where the importance of ethically implementing technological resources in education is emphasized. In this sense, the discourses associated with this dimension (TEPK) are related to concepts that have to do, again, with "copyright" and "authorship" to define the use of technology from an ethical perspective as teachers. Also, in their imagination, they point out the terms "safe" and "protected" as those tasks that are part of the professional ethics of teachers when classes are implemented with technologies.

Finally, the results of the research question related to the self-perception of teachers in training regarding their ethical knowledge of technologies from the pedagogical dimension (PTECK),

the results show a positive evaluation of the participants, indicating that they perceive themselves as sufficiently prepared to address issues such as intellectual property in digital resources and materials or their ability to discriminate against non-sexist, discriminatory or violent materials; and to propose tasks in which ethical principles such as equity or honesty are transmitted. This is one of the key aspects of ethics in technologies, as indicated by Gómez-Trigueros et al. (2021), who insist on the necessary training in digital teaching skills so that teachers recognize that technologies can hide gender biases or a lack of respect for diversity. Thus, in the analyzed narratives of the participants' speeches, concepts associated with professional teaching ethics such as "Respect", "Diversity" and "Non-violent-sexist-racist resource" are emphasized. These results are indicative of the awareness in society and among teachers in training about the non-neutrality of Internet content and technologies. These data coincide with the results of other works (Craiut & Iancu, 2022) where biases related to gender or ethnic issues are observed in platforms and in Internet content. Pre-service teachers thus align themselves with the importance of ethics in the use of technologies and Internet content to avoid creating automated algorithmic barriers (Gómez-Trigueros & Ortega-Sánchez, 2022; Szlavi & Guedes, 2023) that affect citizens.

Furthermore, from the results obtained in this research, it is observed that the participating pre-service teachers find it difficult to relate professional teaching ethical knowledge (PEK), professional technological ethical knowledge (PTEK), and technological pedagogical ethical knowledge (TEKP).

6. Conclusion

This study analyses the knowledge and self-perception of pre-service teachers regarding the ethical component of the use of technologies. The results based on a questionnaire and small group interviews that collect four dimensions of the TPACK framework interrelated with ethics revealed that pre-service teachers have difficulties in recognising ethics in the use of technologies for the classroom and in defining the concepts associated with the ethics of the teaching profession. The research also reveals that pre-service teachers recognise the importance of the authorship of content hosted on the Internet, as well as of teaching materials created with technologies, and that they value the protection of the personal data of their future students, considering the incorporation of ethical aspects in teacher training to be very important. In addition, the research highlighted the importance of the TPACK theoretical framework as an appropriate model with great potential to address training in digital teacher skills and the need to incorporate ethics as a key element. By providing a model design with the ethical component for teaching, this work contributes to previous studies on ethics and technologies in education, as well as to the existing literature. It also promotes the understanding that it is not enough to have training in disciplinary content but that teachers must have pedagogical training and training in digital technologies oriented to the task of educating in ethics. Future proposals must address teaching practice by promoting classroom interventions that recognize the importance of ethics in the teaching and learning process as a value in the formation of citizenship. In conclusion, this research seeks to have teacher training centers investigate the resolution of issues related to how teachers manage the use of ICT tools in the educational process; how they design classroom strategies from the safe use of content, respect for the authorship of resources and responsible use with specific strategies in the classroom.

7. Recommendations

Integrating ethics in the use of technologies requires a change in the way of approaching the subject, with the aim of promoting the construction of technological knowledge that is ethical and holistic. The objective should not be limited only to incorporating ICTs in an educational plan for use in the classroom but also to strengthen teacher training for the development of critical thinking on the importance of technologies and ethics, promoting the inclusion of ethical training from the faculties of education.

We agree with Gómez-Trigueros et al. (2021), Kadıoğlu-Akbulut et al. (2023), and Maroofi et al. (2023) that the inclusion of ethics in the use of technologies for teachers must be taken into account in the preparation of future teachers as another professional element, in today's society, of the 21st century, mediated by technologies.

It is considered essential to train students to be able to apply their critical-ethical thinking and, in this way, to be able to make conscious and committed use of information and data on the Internet, and ethics is part of the use of technology in the classroom. Through the modification of the TPACK model (called TPACKEA), emphasis is placed on the idea that teachers must apply ethics in the use of educational technology, instructional design, and the development of teaching materials. This process should promote digital teaching skills such as respect for authorship, critical thinking regarding sources, and ethical participation in favour of the fight against fake news, non-recognition of authors, and biases related to accessibility and equal use of information and technologies. As the existing literature has already shown, it is essential that professionals working in teaching show students the correct use of technological resources, which can contribute to generating, in the end, ethical spaces committed to knowledge, critical, participatory, and empowering the inclusion of all.

8. Limitations

When analyzing and interpreting the results of this study, it is essential to take into account the following limitations:

The fact that the study was carried out in a single institution limits its generalization to other universities in Spain. It would be necessary to implement and evaluate educational interventions related to ethics in the use of ICT in a broader context. 2) The perceptions and results are based on a non-probabilistic sample, specifically a convenience or accidental sample. To reinforce the validity of the findings, it would be advisable to carry out a probability sample that allows obtaining more representative samples of the target population (future teachers). 3) The narratives written by the participants constitute an extensive set of self-reported data, which can generate biases derived from selective memory or the influence of information disclosed in the media when answering the interviews.

References

Alhadabi, A., & Karpinski, A. C. (2020). Development and psychometric assessment of the social media motives scale among university students. European Journal of Educational Research, 9(2), 835-851. https://doi.org/10.12973/eu-jer.9.2.835

Amelia, I., Hasanah, D., & Yahya, M. M. (2026). Strategies of Moral Faith Teachers in Integrating SDGs-Based Character Education in Islamic Boarding Schools. Profetika: Jurnal Studi Islam, 27(01), 135-154. https://journals2.ums.ac.id/profetika/article/download/14952/5590

Anderson, K. (2005). Christian ethics in plain language. Thomas Nelson Inc.

Asamoah, M. K. (2019). TPACKEA model for teaching and students' learning. Journal of Academic Ethics, 17, 401-421. https://doi.org/10.1007/s10805-019-09326-4

Atun, H., & Usta, E. (2019). The effects of programming education planned with TPACK framework on learning outcomes. Participatory Educational Research, 6(2), 26-36. https://doi.org/10.17275/per.19.10.6.2

Baran, E., & AlZoubi, D. (2023). Design thinking in teacher education: Morphing preservice teachers' mindsets and conceptualizations. Journal of Research on Technology in Education, 56(5), 496-514. https://doi.org/10.1080/15391523.2023.2170932

Boydston, J. A. (Ed.). (1988). John Dewey: The middle works, 1899-1924, Volume 14, Human Nature and Conduct 1922. Southern Illinois University Press.

Carter, D. F., Ro, H. K., Alcott, B., & Lattuca, L. R. (2016). Co-curricular connections: The role of undergraduate research experiences in promoting engineering students' communication, teamwork, and leadership skills. Research in Higher Education, 57, 363-393. https://doi.org/10.1007/s11162-015-9386-7

Çelik, S., & Baran, E. (2022). Student response system: Its impact on EFL students' vocabulary

achievement. Technology, Pedagogy and Education, 31(2), 141-158. https://doi.org/10.1080/1475939X.2021.1986125

Cohen, L., Manion, L., & Morrison, K. (2007). Research methods in education (6th ed.). Routledge. https://doi.org/10.4324/9780203029053

Craiut, M.-V., & Iancu, I. (2022). Is technology gender neutral? A systematic literature review on gender stereotypes attached to artificial intelligence. Human Technology, 18(3), 297-315. https://doi.org/10.14254/1795-6889.2022.18-3.6

Denzin, N. K., & Lincoln, Y. S. (Eds.). (2018). The SAGE handbook of qualitative research (5th ed.). SAGE.

Elesin, A. M. J., & Yahya, M. M. (2018). An Overview of Islamic Guidance and Counselling. KWASU Journal of Religious Studies, 2(2), 41-51.

Ganote, C., & Longo, P. (2015). Education for social transformation: Infusing feminist ethics and critical pedagogy into community-based research. *Critical Sociology*, *41*(7/8), 1065-1085. https://doi.org/10.1177/0896920514537843

Gao, T., Siegel, P., Johar, J. S., & Sirgy, M. J. (2008). A survey of management educators' perceptions of unethical faculty behavior. Journal of Academic Ethics, 6, 129-152. https://doi.org/10.1007/s10805-008-9062-z

Glaser, B., & Strauss, A. (1999). Discovery of grounded theory: Strategies for qualitative research. Routledge. https://doi.org/10.4324/9780203793206

Gómez-Trigueros, I. M. (2023). Digital skills and ethical knowledge of teachers with TPACK in higher education. Contemporary Educational Technology, 15(2), Article ep406. https://doi.org/10.30935/cedtech/12874

Gómez-Trigueros, I. M., & Ortega-Sánchez, D. (2022). The teaching professional ethical knowledge and its presence in the inclusion of technologies in the present educational context. Edutec, Revista Electrónica de Tecnología Educativa, (80). https://doi.org/10.21556/edutec.2022.80.2345

Gómez-Trigueros, I. M., Ponsoda López de Atalaya, S., & Díez Ros, R. (2021). Towards an insertion of technologies: The need to train in digital teaching competence. International and Multidisciplinary Journal of Social Sciences, 10(3), 64-87. https://doi.org/10.17583/rimcis.8652

Graham, C. R. (2011). Theoretical considerations for understanding technological pedagogical content knowledge (TPACK). Computers & Education, 57(3), 1953-1960. https://doi.org/10.1016/j.compedu.2011.04.010

Hernández-Sampieri, R., & Mendoza, C. (2018). Research methodology: Quantitative, qualitative and mixed routes. Mc Graw Hill. https://doi.org/10.22201/fesc.20072236e.2019.10.18.6

Kadıoğlu-Akbulut, C., Cetin-Dindar, A., Acar-Şeşen, B., & Küçük, S. (2023). Predicting preservice science teachers' TPACK through ICT usage. Education and Information Technologies, 28, 11269-11289. https://doi.org/10.1007/s10639-023-11657-0

Kuckartz, U. (2014). Qualitative text analysis: A guide to methods, practice and using software. SAGE. https://doi.org/10.4135/9781446288719

Maisuna, M. Y., & Aliyu, M. M. (2025). Pros and Cons of Artificial Intelligence (AI) in the Light of Islamic Laws' Verdicts (Fatawa). Journal of Development and Society, Faculty of Social Science, 7(1). https://uniabujafsos.com.ng/index.php/jdsfoss/article/download/25/19

Maisuna, M. Y., Tambiyi, G. Y., & Gall, M. ICT and the Enhancement of English Language and

Literature-in-English. https://www.academia.edu/download/79911115/Tambiyi_Michael_Jesus_in_the_Old_Testament.pdf

Malone, D. M. (2020). Ethics education in teacher preparation: A case for stakeholder responsibility. Ethics and Education, 15(1), 77-97. https://doi.org/10.1080/17449642.2019.1700447

Maroofi, Y., Mohammadpour, E., Heidari, S., & Avari, S. (2023). Teacher ethical knowledge the role of knowledge and ethical beliefs in the model of teacher's professional qualifications (TPACK) dge. Research in Teaching, 11(1), 168-139. https://bit.ly/3XKMy7f

Mâță, L., Poenaru, A.-G., & Boghian, I. (2022). Current issues of ethical use of information technology from the perspective of university teachers. In L. Mâță (Ed.), Ethical use of information technology in higher education. EAI/Springer innovations in communication and computing (pp.163-179). Springer. https://doi.org/10.1007/978-981-16-1951-9_11

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017-1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mohamed, A. A., Yahya, M. M., & Sabir, M. R. (2026). Evaluating Vygotsky-Based Professional Development Models for Islamic Educators. Amandemen: Journal of Learning, Teaching and Educational Studies, 4(1), 35-51. https://amandemen.my.id/index.php/i/article/download/114/48

Muammar, S., Hashim, K. F. B., & Panthakkan, A. (2023). Evaluation of digital competence level among educators in UAE Higher Education Institutions using Digital Competence of Educators (DigComEdu) framework. Education and Information Technologies, 28, 2485-2508. https://doi.org/10.1007/s10639-022-11296-x

Pardo, A., Ruiz, M. A., & San Martín, R. (2015). Análisis de datos I: en ciencias sociales y de la salud [Data analysis I: In social and health sciences]. Síntesis.

Raykov, T., & Marcoulides, G. A. (2017). Evaluation of true criterion validity for unidimensional multicomponent measuring instruments in longitudinal studies. Structural Equation Modeling: A Multidisciplinary Journal, 24(4), 599-608. https://doi.org/10.1080/10705511.2016.1172486

Redecker, C., & Punie, Y. (2017). European framework for the digital competence of educators. Publications Office of the European Union. https://doi.org/10.2760/178382

Schmid, M., Brianza, E., & Petko, D. (2020). Developing a short assessment instrument for Technological Pedagogical Content Knowledge (TPACK.xs) and comparing the factor structure of an integrative and a transformative model. Computers and Education, 157, Article 103967. https://doi.org/10.1016/j.compedu.2020.103967

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. Educational Researcher, 15(2), 4-14. https://doi.org/10.3102/0013189X015002004

Skulmoski, G. J., Hartman, F. T., & Krahn, J. (2007). The Delphi method for graduate research. Journal of Information Technology Education, 6, 1-21. https://doi.org/10.28945/199

Strom, K. J., & Viesca, K. M. (2021). Towards a complex framework of teacher learning-practice. Professional Development in Education, 47(2-3), 209-224. https://doi.org/10.1080/19415257.2020.1827449

Szlavi, A., & Guedes, L. S. (2023, July). Gender inclusive design in technology: Case studies and guidelines. In M. Aaron, E. Rosenzweig, & M. M. Soares (Eds.), Proceedings of the 12th International Conference- DUXU 2023: Design, user experience, and usability (Part 1, pp. 343-354). Springer. https://doi.org/10.1007/978-3-031-35699-5_25

United Nations, Educational, Scientific and Cultural Organization. (2021). Recommendation on the ethics of artificial intelligence. https://bit.ly/3AHC9k4

Whitehead, D., & Aviles, J. M. (2018). International code of ethics for educators. Childhood Education International. https://bit.ly/4fJluvm

Yahya, M. M., & Adedeji, O. A. (2024). Global Collaboration and Partnerships in Poverty Alleviation: Islamic Legal Perspective. Journal of Islamic Studies and Arabic Language, 3(2), 148-165. https://www.researchgate.net/profile/Alwy-Mohamed/publication/399984800_Islamic_Law_and_English_Law_as_Sources_of_Nigerian_Law_An_Analytical_and_Comparative_Study/links/6971ef5bf5b9fd48849b4409/Islamic-Law-and-English-Law-as-Sources-of-Nigerian-Law-An-Analytical-and-Comparative-Study.pdf

Yahya, M. M., & Adedeji, O. A. (2024). Global Collaboration and Partnerships in Poverty Alleviation: Islamic Legal Perspective. Journal of Islamic Studies and Arabic Language, 3(2), 148-165. https://journals.iuiu.ac.ug/index.php/jisal/article/download/718/522

Yurdakul, I. K., Odabasi, H. F., Kilicer, K., Coklar, A. N., Birinci, G., & Kurt, A. A. (2012). The development, validity and reliability of TPCK-deep: A technological pedagogical content knowledge scale. Computers and Education, 58(3), 964-977. https://doi.org/10.1016/j.compedu.2011.10.012

Zhu, X., & Liu, J. (2020). Education in and after Covid-19: Immediate responses and long-term visions. Postdigital Science and Education, 2, 695-699. https://doi.org/10.1007/s42438-020-00126-3