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# Ethical Issues in the Use of Technologies in Education Settings: A Scoping Review

## Cuestiones éticas en el uso de tecnologías en contextos educativos: una revisión panorámica

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ABSTRACT

The increasing technology usage in educational settings has not always regarded the ethical implications that may involve its use. Despite its impact, educational practice has shown limited interest in caring about ethics, and research has only sparked slight attention to explore these issues. This scoping review aims to provide an overview of the evidence available in educational research and practice concerning ethical issues of educational technology and the knowledge gaps in the topic. A sample of 99 studies was included in the review and coded according to the basic characteristics of the study, research scope and methods, strategies, and recommendations. Data collected provides evidence of important research growth in two concrete time periods: 2006-2010, with the emergence of social media, and 2015-2020, which includes the pandemic educational emergency time. The findings also show two prominent research topics: Data privacy/confidentiality and Academic honesty and intellectual property. Many topics were present from the early years of the Educational Technology field, while others appeared recently in the 21st century. An important presence of theoretical studies shows that philosophical discussion is still predominant, and timid movements concerning educational practice are observed. Conclusions reflect the need to work on further recommendations towards practices that actively consider these ethical issues in educational technology.

*Palabras clave*
tecnoética educativa, tecnología educativa, revisión de alcance, revisión de literatura, integridad académica, privacidad de datos

RESUMEN

El creciente uso de la tecnología en escenarios educativos no siempre ha tenido en cuenta las implicaciones éticas que puede conllevar su utilización. A pesar de su impacto, la práctica educativa ha mostrado un interés limitado por preocuparse por la ética, junto con el hecho de que la investigación solo ha despertado una ligera atención para explorar estas cuestiones. Esta revisión panorámica pretende ofrecer una visión general de las evidencias disponibles en la investigación y la práctica educativas en relación con las cuestiones éticas de la tecnología educativa, así como las lagunas de conocimiento sobre el tema. Se incluyó en la revisión una muestra de 99 estudios y se codificaron según las características básicas del estudio, el alcance y los métodos de investigación, las estrategias y las recomendaciones. Los datos recopilados muestran un importante crecimiento de la investigación en dos periodos de tiempo concretos: 2006-2010, con la aparición de los medios sociales, y en 2015-2020, que incluye el tiempo de emergencia educativa pandémica. Los resultados también muestran dos temas de investigación destacados: privacidad/confidencialidad de los datos y honestidad académica y propiedad intelectual. Muchos de los temas estaban presentes desde los primeros años del campo de la Tecnología Educativa, mientras que otros aparecieron recientemente en el siglo XXI. Una importante presencia de estudios teóricos muestra que la discusión filosófica sigue siendo predominante, y se observan tímidos movimientos en relación con la práctica educativa. Las conclusiones reflexionan sobre la necesidad de trabajar en nuevas recomendaciones hacia prácticas que consideren activamente estas cuestiones éticas en tecnología educativa.

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## 1. Introduction

Ethics has always been a concern in Educational Technology since the very beginning of the field. This fact can be also seen in Educational Technology formal definitions; for instance, as early as 1977's definition by Ely and Plomp (1996) (cited in Moore & Ellsworth, 2014)[1], or in the AECT definition (Januszewski & Molenda, 2007; Spector, 2016, p. 1003)[2]. Concretely, educational technoethics (Cortés Pascual, 2006; Kimmons, 2020; Kimmons & Rosenberg, 2022) is an interdisciplinary field "dedicated to social and ethical aspects of technology within formal and informal educational contexts (education, training, and evaluation)" (Luppicini, 2010, p. 164). Ethical issues of educational technology refer to questions (often posing dilemmas and grey zones) of right and wrong, "good or acceptable behavior and practice [and] unacceptable or harmful behavior and practice" that face educational stakeholders (e.g., educational institutions, administrators, instructors, students) when using technology in education settings, including the impact of actions and inactions (Olcott et al., 2015; Spector, 2016, p.1005).

Until the last 100 years approximately, when "thought was given to technology at all, it was generally assumed to be an inherent good" (Moore & Ellsworth, 2014, p. 114). In seminal work, Yeaman et al. (1994) argue about the inherent social and political values of educational technology and the naive approach of computing school based on fun, learning improvement or to develop the mandatory skills needed for the future and the workforce. Over the first two decades of the 21st century the usage of technology in the educational context has been considerably extended, while the critical voices of the ethical issues that emerged during this evolution were only marginal (Castañeda & Selwyn, 2018). The forced, generalized use of technologies in every educational context during the remote education period due to the pandemic, made that many more critical voices arose with regards to related ethical issues (Krutka et al., 2022; Williamson et al., 2020). Along with increased research interest on long studied ethical issues in educational technology such as intellectual property or data privacy, other issues are more recent in the field. Artificial intelligence applications in education, at the crossroads between algorithms and computation, education and big data, have also raised ethical questions concerning the use of algorithms in education, of learning analytics and data used in artificial intelligence (Holmes et al., 2021). Intellectual property, accessibility, access and the digital divide, security, and privacy, have been matters of ethical concern of educational technology researchers since early times in Educational Technology, though usually tending more towards a philosophical and/or legal discussion than to the ethical approaches and their connection to educational practice with technology (Moore & Ellsworth, 2014).

Technology requires ethical scrutiny so it can be implemented in a proper way in education, and assuming a holistic and systemic approach, by including all layers (Cortés Pascual, 2006). Some conceptual frameworks have addressed this topic. For instance, Spector (2016) provides a preliminary educational technology ethics framework with three interacting dimensions (values, principles, and people) and two additional dimensions (context and technology). Among people, the educational actors involved in educational technology practices can be found, such as the designer, the instructor, or the students. Another valuable framework is the one by Lucey and Grant (2009), which, based on previous categorizations from Mason (1986) (PAPA framework) and Peace and Hartzel (2002), details five dimensions of moral use of educational technology in continuums for administrators, teachers and students in K-12 settings: property, accessibility, privacy, accuracy and freedom of speech (added by Peace and Hartzel (2002)). Property refers to intellectual property rights and is defined as "who owns ideas and their expression" and "result from personal efforts to develop various technological documents, presentations, etc." (Peace & Hartzel, 2002, p. 19). Accessibility refers to the equitable/inequitable distribution of and access to technological resources (Lucey & Grant, 2009), corresponding to the first level of the digital divide (Aissaoui, 2021). This latter author describes two further digital divide levels: the second-level divide as the effective use of technology and e-skills, and the third level as the performance associated with technologies and offline outcomes. Privacy is conceived as an element of security since it is information that each person or institution chooses to be private, and the context of usage is relevant (Lucey & Grant, 2009). The phenomenon of datafication in education and the increased use of learning analytics with the Covid-19 pandemic (Williamson et al., 2020), as well as the increased presence of artificial intelligence applications in education

[1] 9. Educational technology has an association and professional communications. [...]. *In addition to facilitating communication among members through its annual convention and three periodic publications, it serves to develop and implement the standards and ethics, leadership, and training and certification characteristics of the profession*. (p. 13).

11. Educational technology operates within the larger context of society. It advocates being a concerned profession—concerned about the uses to which its techniques and applications are being put. [...]. (p. 13).

[2] "Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources". (p. 1003)

(Holmes et al., 2021), have been related to this ethical issue. Accuracy refers to informational interpretations of an individual or group and goes along with suitability and in tension with safety/honesty on the internet. This means considering the internet both as a legitimate tool for finding information and a source of sensationalized information and fake news. Freedom of speech is considered in this respect as instructional freedom. Although Lucey and Grant's framework is contextualized in instructional technology in primary education settings, it may partially support an initial conceptualization that can be complemented in other educational settings.

Although all—"old and new"—ethical issues are relevant and of concern in educational technology as an object of study (Carrera Farran et al., 2016), there is still limited research and work regarding these matters. Some studies look at the state of the art of the literature of ethics in educational technology that detected the scarce presence of the study of these topics in the research field. —For example, the study by Moore and Ellsworth (2014), which included the search within specific journals; or the study by Kimmons (2020), which employed bibliometrics and web scrapping to look at trends—. However, to the best knowledge of the authors, no systematic approaches to review the literature on the ethical issues that arise when using technology in educational contexts had been conducted so far.

Therefore, in this study, the authors aim to scope the body of literature of the ethical issues in the educational practices that include the use of technology through a systematic scoping review. This will provide valuable insights into the ethical issues of educational technology studied so far, highlight important gaps to address in research and practice and reveal recommendations for further educational practice.

## 2. Method

The method used in this study is a scoping review, which is defined as a "preliminary assessment of potential size and scope of available research literature" (Grant & Booth, 2009, p. 95), "with a view to informing a future predetermined systematic review or primary research" (Sutton et al., 2019, p. 211).

A scoping review aims to provide an overview or map of the evidence, identify the types of available evidence in these issues, examine how research is conducted on this topic, identify elements and characteristics related to ethical issues of Educational Technology and knowledge gaps in the topic (Munn et al., 2018). As recommended by Page et al. (2021) for this kind of review, the study follows the PRISMA reporting guidelines for systematic reviews along with the PRISMA extension for Scoping Reviews (PRISMA-ScR) (Tricco et al., 2018).

Our protocol was developed by the first author and agreed upon with the second one, pre-registered with the Open Science Framework on 21st February 2022, but publicly published on 8th February 2023 (https://doi.org/10.17605/OSF.IO/YDTQH).

The phases of a scoping review, which are then deployed as follows, are Arksey and O'Malley (2005): 1) identify the research question, 2) identify relevant studies, 3) study selection, 4) chart the data, and 5) collate, summarize and report the results.

### *2.1. Identification of the research question*

The research question posed was: What is known from the existing literature about ethical issues emerging in the educational practice that integrates the use of technology and what recommendations are provided to address them?

### *2.2. Identification of relevant studies*

#### 2.2.1. Eligibility criteria

Considering the aim of the scoping review of providing an overview on the topic, there were no restrictions in terms of year (all publications up to the search dates in 2022 were included), type of publication or publication language in the eligibility criteria of the studies for their screening. However, studies were excluded if they: a) did not focus on an education setting, b) were not related to the use of technology, c) were related to ethical issues of technology for professional use or for engineering (development of technology), or d) did a superficial mention to ethical issues in educational technology (e.g., at the end of the paper, as a consideration) (see Table 1).

Table 1. Eligibility criteria.

| Inclusion criteria | Exclusion criteria |
|---|---|
| Education setting (students, instructors, administrators)<br>Ethical issues related to the use of technology OR Computing ethics (for the use of technology) | No education setting (workplace, medicine, research, etc.)<br>Not related to the use of technology (general ethics, etc.)<br>Ethical issues of technology for professional use (social work, business, etc.)<br>Ethical issues for engineering (technology design and development)<br>Superficial mention of ethical issues in educational technology (mention of ethics at the end)<br>Using technology to teach ethics (not ethics related to technology) |

The presence of one exclusion criterion in a publication was the reason for removing it from the sample. In contrast, the presence of all inclusion criteria was needed to include a publication in the sample.

#### 2.2.2. Information sources and search

Three broad international databases in English and Spanish-speaking countries were chosen due to their broad coverage of peer-review journals and to institutional access: Web of Science, Scopus and Dialnet.

Searches were done at different times using similar keywords, but diverse Boolean operators depending on how the database used them. Special mention has to be done to the different keywords structures to search for ethical aspects: in the case of English, the keyword(s) needed to be more concrete (hence, the use of "ethical issue*" and "ethical use") due to the high number of records retrieved that were not related to ethics in educational technology (e.g., about professional ethics); whereas in the case of the Spanish keywords, the main word "ético" could be maintained, since less records were obtained. According to the aim of the scoping review and the objective of this study of scoping the body of literature of the ethical issues in the educational use of technology, we opted to use generic keywords related to ethics instead of pointing already toward specific ethical issues in educational technology, even though being aware that this fact could be a limitation of the study.

Even though the search was done in Spanish and English, which are the ones that both reviewers had proficiency in, if articles in other languages related to the topic of the study were found, they would also be included.

The summary of the searches done, the search strings, filters used, and initial records found are shown in Table 2. Filters were needed to reduce the number of records and make the search results more relevant for the purposes of the study. For example, this was why, on Web of Science, the search was done only in the abstracts, and keywords were not included in the search on Dialnet, as specified below.

Table 2. Searches' details in the three international databases.

| Database | Date of search | Search string | Filters | Initial records found |
|---|---|---|---|---|
| Web of Science | 20/01/2022 | AB=(education OR educacion OR learning OR teaching OR aprendizaje OR enseñanza OR docencia) AND AB=("ethical issue*" OR etico OR "ethical use") AND AB=(technolog* OR tecnolog*) | Search only in Abstract | 397 |
| Scopus | 20/01/2022 | TITLE-ABS-KEY(education OR educacion OR learning OR teaching OR aprendizaje OR enseñanza OR docencia) AND TITLE-ABS-KEY("ethical issue*" OR etico OR "ethical use") AND TITLE-ABS-KEY(technolog* OR tecnolog*) | Search only in Title, Abstract or Keywords | 971 |
| Dialnet | 25/04/2022 | (educacion OR aprendizaje OR enseñanza OR docencia) AND ("aspecto* etic*" OR etic* OR "uso etico") AND (tecnologi* OR TIC) | Search only in Title or Abstract<br>By descriptors: ética | 115 |

### *2.3. Study selection*

Screening for the study selection was done by two human reviewers with the support of specific software in two phases: 1) based on title and abstract, and 2) based on full text. Before the screening, duplicate records were removed with the reference management software Zotero.

The first screening phase was supported using the systematic review software Rayyan[3]). EPPI-Reviewer (Thomas et al., 2020) was used in the second one, due to their higher features for full texts. Both software

[3] https://www.rayyan.ai/

support researchers in managing and analyzing data in their collaborative systematic literature reviews, being all the decisions taken by the human reviewers.

Concerning reliability between the two reviewers, two processes were carried out. On one hand, in the first screening phase, all records without duplicates were screened based on title and abstract in equal parts for inclusion or exclusion. A "maybe" code could be assigned when one of the reviewers had doubts about including/excluding a record. These studies were then revised by the other reviewer and discussed by the two of them in regular discussions, being every other week in initial reviews while doing first screening, and every week when approaching to the end of this first screening phase, for discussion on remaining doubts for inclusion/exclusion.

After this phase, the reviewers tried to retrieve the studies that were included in the first screening for a second screening based on full text. Although many of the articles were open access or published in journals with institutional subscription, some others were not and, when it was possible, publications were requested to their authors (n=24). However, only four were obtained through this means— 38 publications were still excluded due to the lack of access.

In the second screening phase, the retrieved studies were assigned in small parts to the two reviewers, and the eligibility criteria were strictly applied. This phase started with a three-round review of the same studies (around 10% of the records each round) by the two reviewers independently, and disagreements (include/exclude) were discussed in regular meetings every week. After the third round, the overall percent agreement was 81%, resulting in an inter-rater reliability Cohen's Kappa of 0.576, considered a moderate level of agreement (Viera & Garrett, 2005). Regular discussions in this phase were still maintained for the records where one of the two reviewers doubted their eligibility for inclusion/exclusion. The first author made the ultimate decision in a few cases of disagreement.

### *2.4. Data charting*

To chart the data, we used EPPI-Reviewer again. In the same shared review, each researcher was assigned the different records that went through the second screening phase and extracted information from each of them according to the following coding schema:

a) Basic characteristics of the study (publication name and type, article type, year of publication).
b) Research scope (topic of study; geographical coverage; educational context, actors; whether the aims are aligned with the theme and how - main or secondary aim; technology identified/used).
c) Others/additional (strategies to work ethical issues in educational technology, and recommendations).

The coding schema for the data charting was defined at the beginning of this phase and redefined during and at the end of the data charting process. An overview of the complete coding schema can be found in Appendix 1. A single study could receive more than one code for some aspects: topic of study, geographical coverage, educational context, actors, and technologies.

Topics of study were manually coded first deductively from the terms from the conceptual framework from Lucey and Grant (2009) as a starting point, and then inductively in order to make sure that new issues, and nuances of the main terms in educational contexts, were included (e.g., by merging codes, changing naming). This coding schema was revised in different rounds by the two researchers before and during the data charting process, who discussed the concepts and agreed on the final version presented in this study. Nevertheless, we acknowledge that it would still need further validation rounds in the future to ensure its completeness. Technology identified/used was manually coded inductively from the data, and also revised in different phases in order to merge and classify the technologies.

When a study had some part discussing strategies and/or recommendations, the checkbox for those codes were marked by selecting the passages related to each of them. These passages are used later to illustrate the examples.

### *2.5. Collation, summary, and report the results*

Basic descriptive statistics in terms of frequencies and percentages regarding the sample in terms of characterization and research scope were calculated and visually represented using either tables or visual representation. Conversely, strategies to work on ethical issues in Educational Technology and recommendations are presented in a narrative format through textual quotes.

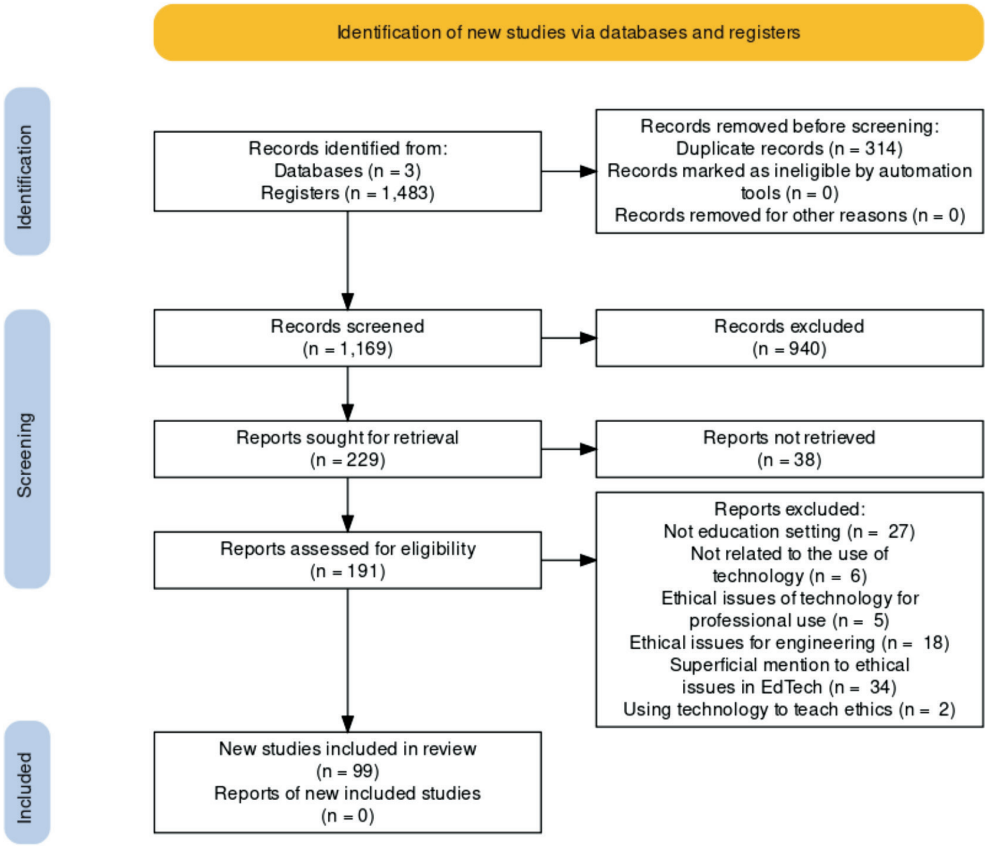
In addition, we prepared visual maps using EPPI-Mapper to cross-tabulate the results between topic results and article type, enabling anyone to consult all the studies sampled.

## 3. Results

### *3.1. Selection of sources of evidence*

Out of 1483 records retrieved from the 3 international databases, the sample was left with 99 studies after the two screening phases. All exclusion reasons were present in the second screening phase, as seen in the flow diagram (Figure 1).

Figure 1. PRISMA Flow Diagram.




Data from the 99 studies can be publicly retrieved from and publicly consulted in our visual map: http://tinyurl.com/eppimapper.

### *3.2. Characteristics of sources of evidence*

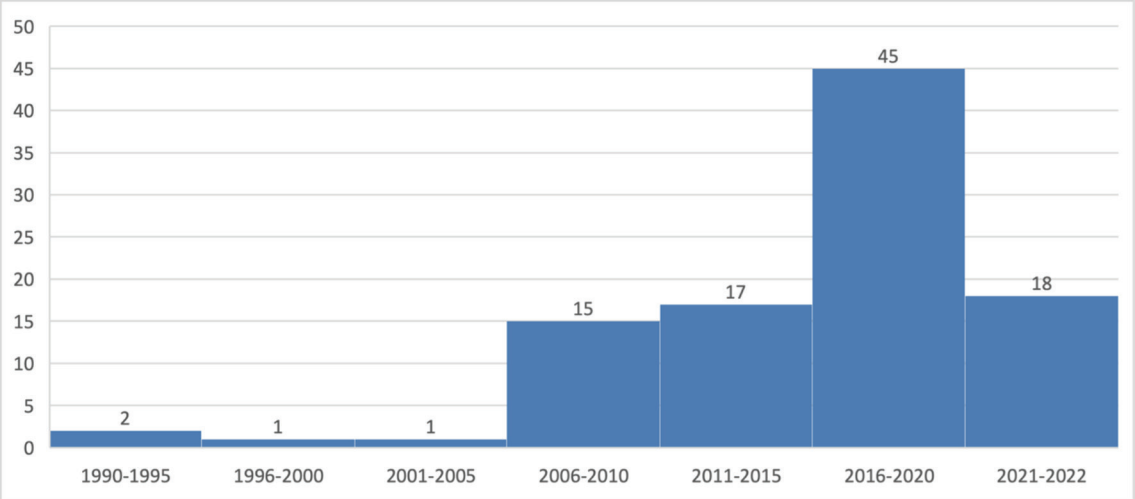
The sample of the scoping review is of 99 studies, being mostly journal articles (n=62), followed by conference proceedings (n=25) and books or book chapters (n=12). Also, theoretical, and empirical research articles lead the article type (n=49 and n=46, respectively). Only 8 studies were showcasing practices or experiences.

Remarkably, the diversity of publications is so high that only one journal has 3 studies (Sustainability), and 8 journals (British Journal of Educational Technology, Informatio, Innovación Educativa, RIED, Research in Learning Technology, Revista Conrado, and Turkish Online Journal of Distance Education) and one conference (ASCILITE) have 2 studies each. The rest (n=79, 79.8%) only have one study per outlet.

In terms of evolution along time, although there were some studies before 2006, interest around ethical issues in Educational Technology seems to start growing from the period 2006-2010 onwards, with an

important peak in the period 2016-2020 (n=45) and can be inferred that the period 2021-2025 will be higher than the previous one in terms of scholarly production about this topic (see Figure 2).

Figure 2. Evolution of production per 5-year periods.



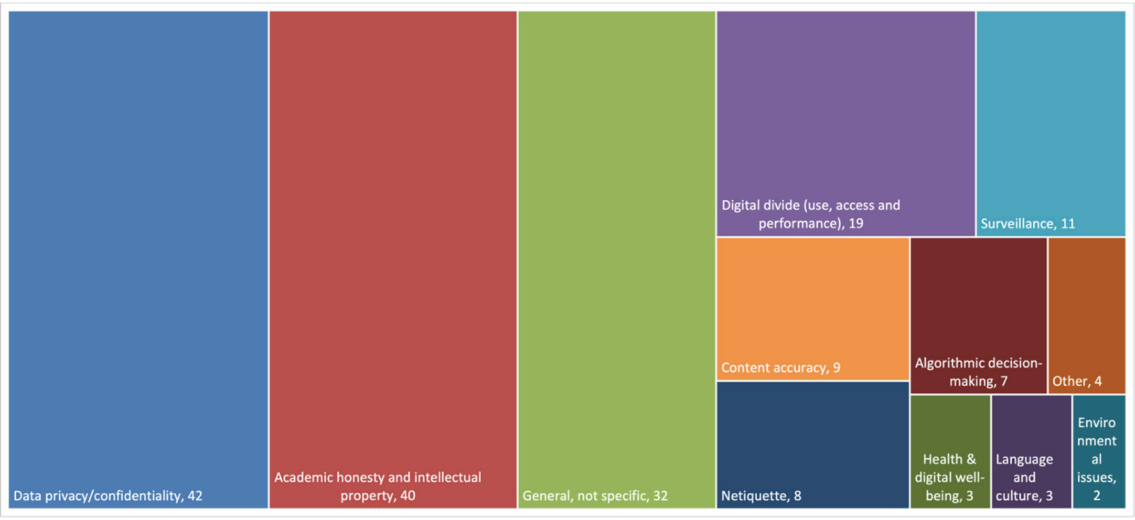

*3.3. Synthesis of results*

3.3.1. Research scope

Concerning topics of study, the most popular ones in the sample are Data privacy/confidentiality (n=42), Academic honesty and intellectual property (n=40), and General/not specific (n=32) (see Figure 3). This latter refers to studies where ethical issues in Educational Technology were not treated specifically. Remarkably, though not with a strong presence in this sample, aspects regarding Language and culture (n=3), Environmental issues (n=2) or Health and digital well-being (n=3) are present.

In addition, most of the studies include ethical issues in Educational Technology as a main aim (n=77), hence as the fundamental focus of the research objective(s)/question(s). 11 studies include those issues as a secondary part of their studies, and therefore not clearly explicit in the research objective(s)/question(s). The same number of studies (n=11) did not include ethical issues in Educational Technology as part of the aim, but rather as something that emerged from the results of the study or that was mentioned as a subtopic.

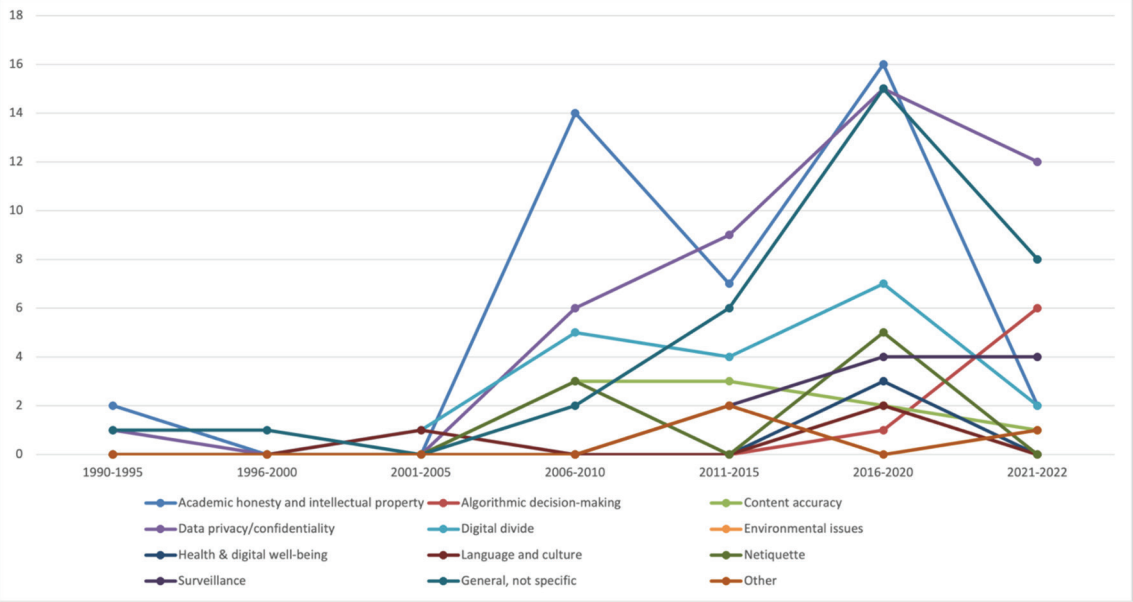
Figure 3. Topics of study (N=99).




Note: A study could include more than one topic.

The evolution in the research interest of these topics has also varied during the years, as can be seen in Figure 4. Overall, all the topics have increased their presence in research but the topic that stands out in each evolution is Data privacy/confidentiality.

Figure 4. Time evolution of topic research interest in ethical issues in Educational Technology per 5-year periods.




In terms of geographical coverage, the largest number of studies did not specify the country to which the study concerns (n=46) (see Table 3), which could be related to the high number of theoretical studies (n=49). In the cases where the study is conducted in a country or institution, locations in Europe (n=19), North America (n=15) and Asia (n=12) are mostly identified. Scarce studies have been carried out in the other continents, especially in the Global South.

Table 3. Geographical coverage of the sample in terms of study location (N=99).

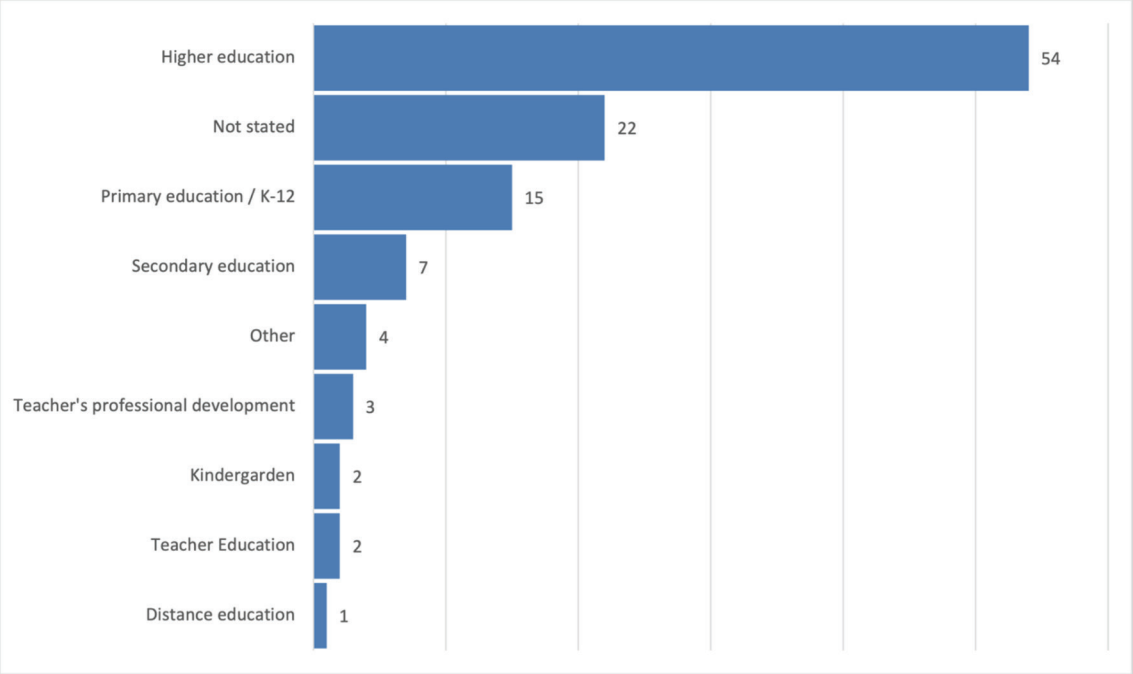
| **Geographical coverage** | **Frequency (n)** |
|---|---|
| Not stated/general | 46 |
| Europe | 19 |
| North America | 15 |
| Asia | 12 |
| Middle East | 6 |
| Oceania | 5 |
| South and Central America | 5 |
| Africa | 1 |

Note: A study could include more than one area.

Topics addressed in this latter case (n=6) deal with the topics of Academic honesty and intellectual property (Africa, n=1; South and Central America, n=2), Language and culture (South and Central America, n=2), Digital divide (South and Central America, n=2), Algorithmic decision-making, Netiquette and General/not specific (South and Central America, n=1, each). Remarkably, no publications in these geographical contexts dealt with the most prominent topic in the sample, Data privacy/confidentiality.

Most of the studies are related to higher education (n=54), although in a considerable number of the whole sample, the educational context was not specified (n=22) (see Figure 5). It is also remarkable that 15 studies refer to primary education, but studies in other levels are rare (e.g., secondary education, kinder garden).

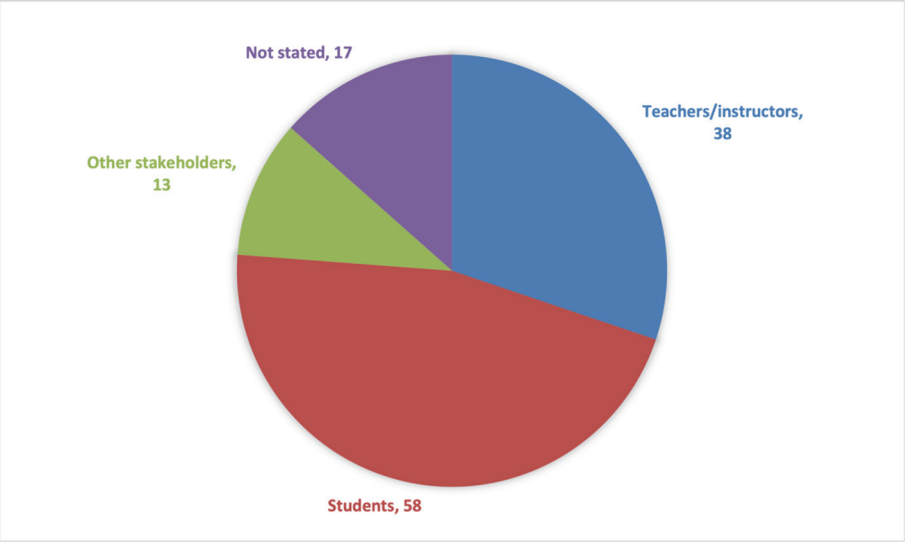
Figure 5. Educational context of the studies (N=99).




Note: A study could include more than one context.

Most of the studies involve or consider students as the main educational actor in relation to the topic of study (n=58), hence as the participants of the empirical studies or explicitly referring to them in relation to the topic of the theoretical study; however, teachers/instructors are also present in 38 of the studies. In 17 cases the educational actors were not explicit (see Figure 6).

Figure 6. Educational actors involved in the studies (N=99).




Note: A study could include more than one educational actor.

Finally, concerning technology involved in the studies, this was not in the spotlight in most of them; in other words, most of the studies did not specify any technology in particular that was related to the emergence of ethical issues of its use in education settings (n=51) (see Table 4). When considered, learning analytics (n=10), plagiarism tools (n=8) and the LMS (n=6) are ranked the top 3.

Table 4. Technology identified / used (N=99).

| **Technology identified / used** | **Frequency** |
|---|---|
| Not stated | 51 |
| Learning Analytics | 10 |
| Plagiarism tools | 8 |
| LMS | 6 |
| Mobile devices | 5 |
| Tracking tools | 5 |
| Other | 4 |
| Augmented Reality/ Virtual Reality/ Mixed Reality | 3 |
| Facial recognition systems | 3 |
| Programming tools | 3 |
| Social media/Web 2.0/ PLE | 3 |
| Social networks | 3 |
| Wearables | 3 |
| Blogs | 2 |
| Robots | 2 |
| Clickers | 1 |
| Computer-Assisted Language Learning (CALL) | 1 |
| Digital camera | 1 |
| e-Advising tools | 1 |
| Online proctoring systems | 1 |
| Presentation tools | 1 |
| Video conferencing systems | 1 |
| Video production tools | 1 |
| Video storage/streaming tools | 1 |

Note: A study could include more than one type of technology.

In addition, specific technologies were often together with concrete topics. For example, learning analytics was linked in 8 studies to Data privacy/confidentiality and 4 to Surveillance. Plagiarism tools were frequently connected to Academic honesty and intellectual property (n=7).

### 3.3.2. Strategies and recommendations

Only 27 out of the 99 studies mention some strategy to work ethical issues in Educational Technology, while 47 make some recommendation to that respect. In Appendix 2, different exemplary quotes for the classifications related to each of them are presented. Depending on the focus, we can identify three types of strategies:

- Pedagogical strategies, which are the most common (n=22). These refer to different aspects that concern pedagogy to work ethical issues in Educational Technology. Among those, we can identify the importance of training, a thoughtful pedagogical and technological design, the creation of a safe and supportive environment or different methods or approaches, such as gaming experiences, virtual visits, open discussion, the use of ethical dilemmas, conversation with invited speakers or teaching with the example.

- Technological strategies (n=9). The adoption of postures to avoid the ethical issues or to control them, the use of own restricted systems or a positive computing/digital well-being attitude are mentioned. Also, for the case of the digital divide, technological loans/provisions appear.
- Organizational strategies (n=6). These strategies refer to faculty members keeping up to date, building an educational community, and following guidelines at the institutional level, the latter especially in the context of learning analytics.

Regarding the recommendations, we can divide them into the ones related to the macro-level (country, region), the meso-level (institution), and the micro-level (teaching and learning):

- Macro-level (n=9). They mostly focus on the importance of developing or improving national or regional guidelines, policy, and legal frameworks to ensure that ethical issues in the educational use of technology are covered. Other aspects concern the creation of an observatory, adopting and using the Ethical Context Continuum, developing and distributing a supranational code of technoethics, and recognizing technologically responsible teaching centers and attitudes.
- Meso-level (n=32). At the institutional level, the set-up of different kinds of privacy mechanisms is the most common recommendation (n=9), along with the development of institutional policies (n=5). Other recommendations are: reduced and restricted access, measures to avoid some ethical concerns, transparency, organizational measures, providing resources to students from the library, establishing partnerships/teamwork between different institutional members and units, availability of technologies, cultivating learning communities for teacher educators and psychological intervention.
- Micro-level (n=46). At this level, the most popular statements are regarding the educator's preparation or training (n=15), including educators of all levels, and students' training (n=14). Others include establishing a set of norms, promoting reflective processes, considering how technology is used by educators, explaining some processes to the students, or having exemplary behavior as an educator. Also, 2 articles mentioned the importance of conducting further research regarding educators' and students' attitudes toward different ethical issues.

## 4. Discussion

Ethical concerns in the context of educational technology that have been historically reviewed are diverse and include different social and technological dimensions and may have various pedagogical implications. For instance, copyright, learner privacy, and accessibility (Lin, 2007; Lucey & Grant, 2009), the digital divide (Aissaoui, 2021), the netiquette (Soler-Costa et al., 2021) or the cross-cultural competence / the considerations of language and culture (Moore & Ellsworth, 2014) are present in the literature. From Lucey and Grant's (2009) conceptual framework, the moral dimensions of property, accessibility, privacy, and accuracy were identified in the study, in different education settings. However, in our study we also identified topics that were almost nonexistent so far, but are starting to gain attention, such as the considerations of environmental issues and health and digital well-being that go beyond instructional technology but also affect (and have impact on) educational contexts and actors.

This study shows that ethical issues related to the use of technology in education settings receive greater attention by research since 2005, when the development of social media originated a dramatic change of roles in the Internet, allowing users to become creators rather than only consumers of knowledge (Weller, 2020). Likewise, our findings show an important uptick of research addressing educational technoethics since 2020, when the Covid-19 pandemic took place and all the topics seemed to experience greater attention (Williamson et al., 2020).

Data privacy/confidentiality was the most prominent topic in our study, especially with regards to students' data privacy and the central role of the teacher or educator with this respect (Marín & Tur, 2023). Concerns about ethical issues with students' data have always been present, but paper-based information was kept in the educational institutions (Alier et al., 2021) and only accessible for some close staff, which involved limited danger of improper usage by third parties. Technology-generated data has introduced new actors who have interests, both from economic and ideological approaches, as spotted by recent research from critical approaches (Castañeda & Selwyn, 2018; Kühn Hildebrandt, 2019; Williamson & Hogan, 2020). This concern is not purely a technological and societal consideration but also a pedagogical one when considering learning analytics for learner monitoring and evaluation, for example.

Concerning social and communicational aspects and related to cultural contexts in their treatment, this study has also shown an important concern about the dishonest use of information and software along with plagiarism practices, often unintentional due to a lack of awareness about intellectual property issues (Kim & Uysal, 2021; Mâță et al., 2022). It has experienced a long trajectory since early times, with an uptick in 2006 when social media were consolidated, and recently reached a new one in research interest during the emergence of the Covid-19 pandemic. The parallel increase of the issue Content accuracy, closely related to information literacy and academic honesty, but also to the current reality of fake news (Soler-Costa et al., 2021), makes evident that these concerns are still relevant. They seem to partially be moving towards practice, too, despite the considerable presence of connections to legal issues in the sample regarding academic honesty and intellectual property (Moore & Ellsworth, 2014).

Such diverse types of issues, like digital well-being from a more individual and social point of view, but also more technology-focused topics such as algorithmic decision-making and surveillance, especially emerged during the second decade of the 21st century. However, while surveillance received balanced attention after 2020, digital well-being does not seem to receive such attention. Also, it is remarkable the balanced attention to the digital divide topic since 2005 and the notable decrease after 2020, especially considering the three levels of inequalities in terms of access and use of technologies (Aissaoui, 2021) and that not only include a technological dimension (access) but also pedagogical ones (use and performance).

Furthermore, two topics present a divergent trend of consideration: netiquette and environmental issues. The former involves a clear communication dimension and was quite explored during the first years of social media growth, defined as the "social code of the Internet [...] (and) includes how we communicate, treat others, describe and protect ourselves online related to ethical issues" (Sari et al., 2020, p. 84). However, it quickly seemed to lose such interest in the second decade of this century, despite its relevance in the current reality of trolls, social media haters, and so on (Soler-Costa et al., 2021).

Environmental issues directly related to technological use have received little attention over the decades, even though it is implicit in some digital competence frameworks, and only recently, it is getting greater attention, which might be aligned with the current global awareness towards climate change. It is worth highlighting that the DigComp framework mentions these issues in its safety competence area (European Commission. Joint Research Centre, 2022).

This scoping review shows the substantial attention to students' privacy issues along with their academic honesty in higher education, apart from the fact that most of the studies are not contextualized in any specific level. This may reveal the limited interest of ethical issues in educational technology outside academia. It is also surprising the lack of studies in teacher education and the difficulties to educate for responsible use (Caena & Redecker, 2019; Marín et al., 2021).

Even though there are some reserves due to limitations regarding languages and databases used, the findings about topics and territories reveal some gaps in the international research context. Thus, the growing interest above over ethical issues such as data privacy, surveillance, digital well-being, and environmental challenges is rather circumscribed to the northern hemisphere. Studies located in the Global South seem to have more to do with the digital divide and cultural and language issues, which is somehow aligned with the claim of digital colonialism and epistemic bias of international research in Educational Technology (see, for example, the work by Adam, 2019). This scarce presence has also been mirrored in other literature reviews (Bond et al., 2021).

Also, the fact that most studies have a general approach, without tackling a particular technology or issue in any concrete context, and the important number of studies with a specific topic, is aligned with the finding that most of the studies are theoretical essays based on conceptual frameworks, but without the support of an empirical inquiry that can help in showing successful practices. The philosophical underpinning background helps in conceptualizing ethical issues and exploring their impact on education and the future of educational technology, but also empirical research based on practices is needed to address those issues; this seems still to be a long-standing issue (Moore & Ellsworth, 2014).

The study also aimed to collect data on recommendations for further educational practice. From a pragmatic perspective, there are different strategies to carry out at the different levels, including pedagogical and organizational ones, which teachers and other staff can mostly address at the meso and micro levels. Therefore, instructional design with technology will also be paramount regarding ethical issues, which should be addressed as an inherent aspect, like the "ethics as design" principle claimed by Whitebeck (1996), cited in Moore & Ellsworth, 2014. It is necessary to keep the spotlight on the teachers' role to take care of ethical issues emerging in the use of technology in their classrooms; however, teachers also should put the focus on students' lifelong learning skills and provide the individual, relational and contextual opportunities for students to enact their agency (Castañeda & Tur, 2020; Marín et al., 2020) regarding these ethical issues.

## 5. Limitations

One of the study's main limitations that needs to be acknowledged is the decision on the keywords of the search strings used. We are aware that this choice, especially concerning the "ethics" part of the string, may have impacted the results obtained. However, due to the nature of a scoping review of providing an overview, we did not want to limit the possible ethical issues related to educational technology that may emerge, so using specific terms would have brought only some topics but perhaps not others that came up in this study. Considering a broader search string, including keywords for the different ethical topics, would be necessary to undertake the next step: systematic reviews on some of those topics.

Also, even though we did not restrict the search to English and Spanish language publications, using keywords in the search strings in those languages may have limited the procurement of records in other languages. Therefore, we may have missed relevant literature on the object of this study. The use of keywords in search strings in other languages and databases for articles published in other languages should be considered for further review.

Concerning the data analysis, we acknowledge that some coding schemes would need further validation rounds, especially the topic classification. Finally, we would like to note the difficulties of conceptualizations of the topics due to differences in understandings and nuances.

## 6. Conclusions

Ethics in educational technologies has been acknowledged since long ago, and early work demonstrates the need to question naive beliefs about the values behind technology (Yeoman et al., 1994). Despite the penetration of technology in education has brought a new perspective into ethical issues, these are still under-studied (Kimmons, 2020; Moore & Ellsworth, 2014).

With this study, we aimed to contribute to the gap in the ethical issues that technology has brought into education and raise research and practice attention within the field. It also expands the view on further and nuanced ethical topics in Educational Technology beyond previous conceptualizations, e.g. (Lucey & Grant, 2009; Moore & Ellsworth, 2014). The wide period that the literature review covers enables us to observe some patterns and, simultaneously, encourages us to strengthen lines of work for further educational research and practice.

Although our findings give evidence of a relevant research strand, this needs to be seen in context under the light of the global research in educational technology. The vast development of Educational Technology in the 21st century does not show the same progress in the ethical aspects, especially from a more applied perspective. Also, the lack of references to them in some recent literature reviews makes evident that in pedagogical designs that include social media use (for example), ethical issues have not been an element of design (Greenhow & Askari, 2017; Otchie & Pedaste, 2020; Zachos et al., 2018). This is changing, and the ethical approach is nowadays a key element to master and design by any citizen and requires further research to enhance it.

Future research will focus on educators' perspectives about these topics and their strategies to deal with them, as well as on validating the topic classification generated in this scoping review.

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## Authors' contribution

**Victoria I. Marín**: Conceptualization, Data curation, Formal analysis, Research, Methodology, Visualization, Writing - original draft, Writing - review and editing
**Gemma Tur**: Conceptualization, Data curation, Formal analysis, Research, Methodology, Writing - original draft, Writing - review and editing

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## Appendix 1. Coding schema

| Categories | Codes | Subcodes |
|---|---|---|
| **Basic characteristics** | Publication name | [Titles of journals, books, etc.] |
| | Publication year | [Years of publications] |
| | Publication type | • (Peer-reviewed) article<br>• Conference proceedings<br>• Book (chapter)<br>• Report<br>• Dissertation |
| | Article type | • Theoretical<br>• Empirical research Practice/experience |
| **Research scope** | Topic of study | • Academic honesty and intellectual property<br>• Algorithmic decision-making<br>• Content accuracy<br>• Data privacy/confidentiality<br>• Digital divide (access, use and performance)<br>• Environmental issues<br>• Health & digital well-being<br>• Language and culture<br>• Netiquette<br>• Surveillance<br>• General, not specific<br>• Other |
| | Geographical coverage | • Africa<br>• Asia<br>• Europe<br>• Middle East<br>• North America<br>• Oceania<br>• South and Central America<br>• Not stated/general |
| | Educational context | • Kinder garden<br>• K-12/Primary education<br>• Secondary education<br>• Vocational education<br>• Higher education<br>• Distance education<br>• Teacher's professional development<br>• Teacher education<br>• Applicable to any<br>• Other |
| | Educational actors | • Teachers/instructors<br>• Students<br>Other stakeholders<br>• Not stated/any of them |
| | Aims aligned with the theme | • Yes, as a main aim<br>• Yes, but as a secondary aim<br>• No |

*(Continued)*

## Appendix 1. Coding schema *(Continued)*

| Categories | Codes | Subcodes |
|---|---|---|
| | Technology | • Augmented Reality/ Virtual Reality/ Mixed Reality<br>• Blogs<br>• Clickers<br>• Computer-Assisted Language Learning (CALL)<br>• Digital camera<br>• e-Advising tools<br>• Facial recognition systems<br>• Learning Analytics<br>• LMS<br>• Mobile devices<br>• Online proctoring systems<br>• Plagiarism tools<br>• Presentation tools<br>• Programming tools<br>• Robots<br>• Social media/Web 2.0/ PLE<br>• Social networks<br>• Tracking tools<br>• Video conferencing systems<br>• Video production tools<br>• Video storage/streaming tools<br>• Wearables<br>• Other<br>• Not stated |
| **Others/additional** | Strategies to work ethical issues in EdTech | |
| | Recommendations | |

## Appendix 2. Examples of quotes per codes "strategies to work ethical issues in EdTech" and "recommendations"

| Codes | Classification | Quotes |
|---|---|---|
| **Strategies to work ethical issues in EdTech** | Pedagogical strategies (n=22) | "*If students are encouraged to openly discuss such assumptions and definitions, they might be less likely to plagiarize and will be more likely to ask for an instructor's help if needed*". (open discussion, in Kim & Uysal, 2021, p. 11)<br>"*Re-Shape, a method to teach students about the ethical implications of data collection and use*". (training, in Shapiro et al., 2020, p. 29) |
| | Technological strategies (n=9) | "[...] *they suggest limiting private activity or to reduce public intervention like on a discussion forum, so that they would leave the least of their traces possible on an open E-learning environment.*" "*The data from the questionnaire also reveal that avoidance of personal data and consent agreement are both strongly relevant to privacy concerns in E-learning. In fact, consent is one of the keystones of privacy research practices in LA*". (limiting online activity, in May & Iksal, 2016, p. 2)<br>"*Still other scholars have suggested using technology to combat technological-based dishonesty through anti-plagiarism software [...] or the use of webcams to verify that online students who complete the work are the same students enrolled in the courses [...].*" (use of software, in Davies & West, 2014, p. 9) |
| | Organizational strategies (n=6) | "*Finally, some researchers have suggested building a supportive social community characterized by a culture of academic honesty [...] because 'students who feel disconnected from others may be prone to engage in deceptive behaviors such as academic dishonesty' (Stuber-McEwen et al., 2009, p. 1)*". (building educational community, in Davies & West, 2014, p. 9) |
| **Recommendations** | Macro level (n=9) | "*A clear implication for policy is that there must be one coherent, well- communicated set of national guidelines in each country to support and encourage institutions and teachers to implement mobile learning in a safe and effective manner*". (Dyson et al., 2017, p. 18) |

*(Continued)*

**Appendix 2. Examples of quotes per codes "strategies to work ethical issues in EdTech" and "recommendations"** *(Continued)*

| Codes | Classification | Quotes |
|---|---|---|
| | Meso level (n=32) | "*The institution must put all the safeguards in place in the systems and procedures to preserve the confidentiality and privacy of the data of all persons who end up taking part in online training, to avoid the dark side of the digital transformation of teaching. From the perspective of quality assurance, the institution must take great care to ensure that all processes, at the various levels, are adapted to guarantee quality assurance and ethics, as well as those aspects that deal with the updating of online content and with the privacy of participants*". (García-Peñalvo, 2021, p. 12)<br>"[To the library staff] *Work with your faculty on developing and improving e-learning policies. Faculty members work firsthand with the learners and see what works and what doesn't. The online faculty members at DSU meet regularly throughout the semester and have worked as a group to implement new policy relevant to our e-learning program.*" (Gearhart, 2008, p. 9) |
| | Micro level (n=46) | Educator's training:<br>"*it is recommended that computer ethics module needs to be included in all teacher education in Turkey to improve the ethical sensibilities on computer use of teachers.*" (Beycioglu, 2009, p. 7)<br>"*the emphasis will be on the training component of university teachers in the context of the ethical use of information technology*". (Mâţă et al., 2020, p. 14)<br>Students' training:<br>"*The variables of both bullying and news hoax show the highest frequency found in students' internet use, which concludes that students are urgently vulnerable to such activities, that mostly they were less capable of avoiding themselves over the use of technology in their everyday lives. To cope with that problem, we need a learning innovation, one of which is through Civics Education Learning. The education unit needs to develop new literacy that students should have, including data literacy, digital literacy and humanistic literacy*". (Sari et al., 2020, pp. 10–11)<br>"*Among other initiatives to promote the responsible use of technology, ensure that school curriculums promote awareness and reflection on the notion of privacy. Ensure that they provide information on personal data protection in a digital environment and that they discuss the tools available for ensuring this protection*". (Olcott Jr. et al., 2015, p. 10) |