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Future Education: Prospective for sustainability and social justice

English Edition

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JOURNAL CITATION REPORTS (JCR)

JCR 2021 (2022-23): Q1. JIF: 5.725. JCI: 2.94. 5 Year Impact Factor: 5.715. Inmediacy Index: 2,000; Eigenfactor Score: 0.00252. Article Influence Score: 1.330; Journal Impact Factor (JIF): Education: Q1 (position 18 from 267; 1st Spanish and Iberoamerican); Communication: Q1 (position 19 from 94, 1st Spanish and Iberoamerican); Journal Citation Indicator (JCI): Education: Q1 (position 12 from 739; 1st Spanish and Iberoamerican); Communication: Q1 (position 6 from 217, 1st Spanish and Iberoamerican).
SOCIAL SCIENCES CITATION INDEX: The top journal in Spanish in Communication since 2007.

SCOPUS

CITESCORE 2021 (2022-23): (9.8): Q1 in Cultural Studies (position 2nd from 1,127) (percentile 99). Q1 in Communication: position 9th from 467 (percentile 98). Q1 in Education (position 17th from 1,406) (percentile 98).
SCIMAGO JOURNAL RANK: SJR 2021 (2022-23): 1.382: Q1 in Cultural Studies, Communication and Education (first journal in Spanish language in Education, Communication and Cultural Studies).

RECYT (FECYT-MEC)

Ranking FECYT 2021 (2022-23): Education: 1st from 76 journals (99.82 points out of 100) (top 1%); Communication, Information and Scientific Documentation: 2nd from 24 journals (93.08 points out 100) (top 1%); **FECYT 2021 Seal of Quality Excellence** (12 indicators).

GOOGLE SCHOLAR

2021 (2022-23): Top 100 of Google: Position 3rd (from 100) in the Spanish ranking of all research journals areas. H5: 44. Mediana H5: 58. En 2022-06-12: H: 102; H5: 82 (56,884 accumulated citations).
According EC3 Reports, 2018 (UGR): H5 Index (2013-2017); 1st in Education (out of 165; H5: 38); 1st in Communication (out of 51; H5: 38).

DIALNET METRICS

Q1: EDUCATION 2020 (2022): position 1st (from 230); IF: 4.545 (909 cites).
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CIRC (INTEGRATED CLASSIFICATION OF SCIENTIFIC JOURNALS) (EC3 Metrics)

2022, Level A+ (highest rated).

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2022: 2nd position among 1,199 selected journals from all areas. Rating: 58.364.

ERIH+

Level INT2 (2022).

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SUBMISSION GUIDELINES

GENERAL INFORMATION

'Comunicar', Media Education Research Journal is published by Grupo Comunicar Ediciones (VAT: G21116603). This established non-profit professional group, founded in 1988 in Spain, specialises in the field of media education. The journal has been in print continuously since 1994, published every three months.

Contents are peer reviewed, in accordance with publication standards established in the APA 7 (American Psychological Association) manual. Compliance with these requirements facilitates indexation in the main databases of international journals in this field, which increases the dissemination of published papers and therefore raises the profile of the authors and their centres.

'Comunicar' is indexed in the Social Sciences Citation Index (SSCI), Journal Citation Reports (JCR), Scisearch, Scopus and over 790 databases, catalogues, search engines and international repertoires worldwide.

Each issue of the journal comes in a print (ISSN:134-3478) and electronic format (www.comunicarjournal.com) (e-ISSN: 1988-3293), identifying each submission with a DOI (Digital Object Identifier System).

SCOPE AND POLICY

Subject Matter: Fundamentally, research papers related to communication and education, and especially the intersection between the two fields: media education, educational media and resources, educational technology, IT and electronic resources, audiovisual, technologies... Reports, studies and experiments relating to these subjects are also accepted.

Contributions: 'Comunicar' publishes research results, studies, state-of-the-art articles and bibliographic reviews especially in relation to Latin America and Europe and regarding the convergence between education and communication, preferably written in Spanish although submissions are also accepted in English. The contributions to this journal may be: Research papers, Reports, Studies and Proposals (5,000-6,700 words of text, references included), State-of-the-art articles: (6,000-7,200 words of text, including references).

Unsolicited manuscripts sent in by authors are initially placed in the Miscellaneous section of the journal. The Topics section is organized by an editor through a system of call for papers and specific commissions to experts in the field. If we receive manuscripts within the deadline for a particular topic, the journal editor can refer the manuscript to the Topics editor for assessment and possible publication in this monographic section. The deadline for each Topic section is at least nine months before publication.

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Carlos III University, Madrid, 2007

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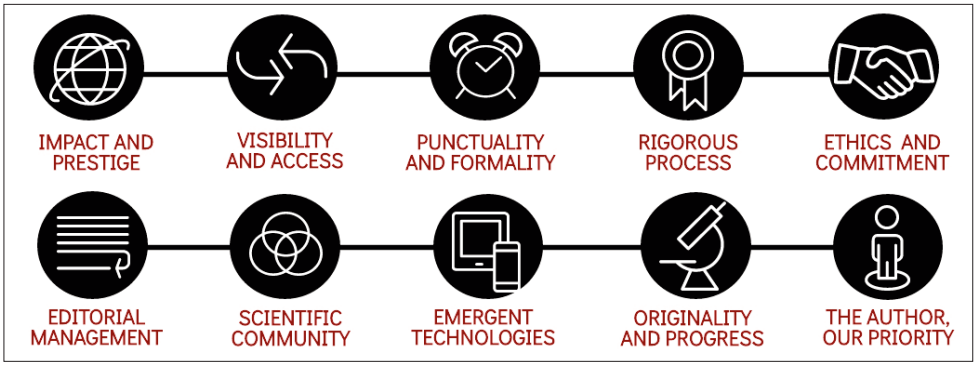

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Information on evaluators, acceptance/rejection rates and internationalisation in Comunicar 73

• Number of research works received: 206. Number of research works accepted: 10.
• Percent of manuscripts accepted: 4.85%; Percent of manuscript rejected: 95.15%.
• Received manuscripts internationalisation: 38 countries.
• Numbers of Reviews: 294 (84 internationals and 210 nationals) (update: www.comunicarjournal.com).
• Scientific Reviewers internationalisation: 23 countries.
• Country of origin: 9 countries (Brazil, Canada, Qatar, Chile, Slovenia, Spain, Mexico, Portugal & United Kingdom).
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19th / 94 Communication
Journal Citation Indicator (JCI)
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Contributions of futures studies to education: A systematic review

Contribuciones de los estudios de futuros para la educación: Una revisión sistemática

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ABSTRACT

Futures studies offer a framework of ideas and guidelines that allow us to develop more productive images of the future and ways of working with it. Despite several efforts to translate this approach to different educational contexts, it is still a field under development. The main objective of this article is to present and discuss the latest international academic developments and contributions of futures studies to education. For this purpose, we conducted a systematic review of the literature using the Web of Science and Scopus databases. We considered articles published between 2012 and 2022. We started with 437 articles and after the application of the exclusion criteria, this number was reduced to 50 articles that were directly related to educational issues. The findings show that the literature included specific educational methodologies, a balance between theoretical and empirical publications, a focus on specialised journals and countries and that multidisciplinarity in education was not common with subjects outside social sciences. Moreover, we found that the predictive approach and negative perspectives were not present. We conclude that futures literacy is a key element to bringing together ideas related to futures studies in education, that futures studies contribute to changing the way of working with and conceptualising the future in education, and that they promote transformative movements.

RESUMEN

Los estudios de futuros ofrecen un marco de ideas y disposiciones a partir de las cuales desarrollar imágenes más productivas del futuro y formas de trabajar con este. Aunque existen múltiples esfuerzos por trasladar estos planteamientos a diferentes ámbitos educativos, aún sigue siendo un campo por desarrollar. El objetivo central de este artículo es exponer y discutir los últimos avances y contribuciones académicas internacionales de estudios de futuros en educación. Para ello, se ha realizado una revisión sistemática de la literatura usando las bases de datos Web of Science y Scopus considerando artículos publicados entre 2012 y 2022. Se ha contado con una muestra inicial de 437 artículos que, al aplicar criterios de exclusión, se redujo a 50 que vinculaban directamente los estudios de futuros a temas educativos. Los hallazgos muestran que las publicaciones contienen propuestas educativas, que existe un equilibrio entre estudios teóricos y empíricos, que se concentran en revistas especializadas, en determinados países y que la multidisciplinariedad es limitada fuera de las Ciencias sociales. Asimismo, encontramos que el enfoque predictivo y las visiones negativas no tienen presencia. Se concluye que la alfabetización en futuros es un elemento clave para acercar las ideas de estudios de futuros al ámbito educativo, que los estudios de futuros contribuyen a cambiar las formas de trabajar y conceptualizar el futuro en educación y que promueven dinámicas transformadoras.

KEYWORDS | PALABRAS CLAVE

Future of education, futures studies, literacy, interdisciplinarity, communication, systematic review.
Educación para el futuro, estudios de futuros, alfabetización, interdisciplinariedad, comunicación, revisión sistemática.

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1. Introduction

We are presently immersed in a pandemic of which we are not yet aware of the consequences. We are more frequently experiencing unexpected and devastating weather phenomena associated to climate deterioration. We observe, perplexed, how international tensions grow, and we are becoming aware that the triumph of a global liberal democracy has not been the "happy" ending of history announced by Fukuyama (2006). Different communication media are accountable for magnifying and even twisting these types of phenomena (Aguaded & Romero-Rodríguez, 2015), feeding the uneasiness that is established in a population that looks towards the future with uncertainty, fear, and impotence (Santisteban & Anguera, 2013).

Faced with this problem, futures studies offer a theoretical and practical framework on which we can develop images of the future that are alternate to those we find to be lacking in rigour or based on hopeless scenarios (Facer, 2016). Futures or Foresight studies propose a way to understand the question of time, in which the interest is not on predicting the future, but on playing with the multiple possibilities it offers[1] (Slaughter, 1996a; 1996b). They present a future that although unknown, is managed in an open, plural, and malleable manner (Bell, 2003). This means re-enforcing the idea that subjects are not passive when facing their destiny but have the capacity to act in the present. This human agency allows them to understand that their actions and thoughts can be oriented towards three types of futures: probable, possible, and preferable (Bell, 1998).

Futures studies have a long tradition and can be represented in various forms. Futures studies is the term that is commonly used to define the multi-disciplinary academic field centred on the study of images and aspects of the future (Marien, 2002). Nevertheless, as shown by Bell (2003) and Kuosa (2011), it is a complex field in which its objectives and purposes have evolved, and in which different epistemological traditions converge. Inayatullah (1998; 2007) distinguishes four traditions of futures studies, inviting us to work on them in a cross-sectional manner:

1) Predictive: it emerges from a determinist point of view of the universe, from which the future can be known/predicted. This perspective works with statistical tools of prediction, highlighting the use of the Delphi method.

2) Interpretive or cultural: it comes from a relativist view that is crystallized in constructivist and sociocultural planning. The interest is not centred on predicting, but on delving into the human condition, and understanding how the different elements and structures that compose it condition the views and possibilities of the future. The methodological tools that are underlined are the comparative study of narratives of the future and the futures scenarios.

3) Critical or post-structural: it assumes that neither predictions nor comparisons are possible, understanding that the future is always undefined. Any stable or agreed-upon prediction, representation, or concept, is problematic, seeking to open and debate any discourse about the future. It comes from methodological approaches such as deconstruction, the analysis of the critical discourse, or genealogy, to develop more specific methods for futures studies such as the causal layered analysis, or the futures triangle.

4) Anticipatory action or participation learning: the main idea of the future is that it is the fruit of deep participation and association. What is sought is the development of probable, possible, and preferable images that emerge from the needs and visions of a group. It could be said that this fourth approach emerges from the analysis of the previous two, from ideas coming from research-action and democratic-participative approaches. The methods are directed towards encouraging participation in the construction and analysis of collective futures, emphasizing a practical and collective character.

Multiple efforts have been made to transfer the ideas and guidelines of futures studies to different education contexts (Gough, 1990; Hicks, 2006; Hicks & Slaughter, 1998; Toffler, 1974). This is especially motivated by the conviction that education could be a way to transmit and assimilate futurist ideas, which can lead to the deep re-orientation and transformation of education, and by extension, of society and human relations, among which we find its relationship with the medium (Bodinet, 2016; Gee & Esteban-Guitar, 2019; Hicks, 2012). In essence, all education is about the future, either because it is oriented towards preparing students for a future at work, participation in social development, or attaining a full life. Education for the future seeks to operate on these three purposes of education, contributing to their

development in different ways, and paying close attention to the students' shaping of images about the future (Anguera & Santisteban, 2016). On the other hand, futures studies are a discipline or a group of ideas that provide theoretical, conceptual, and methodological tools that could be utilized in futures education.

A key element for understanding the relationship between education and futures studies is Futures Literacy. This is a relatively new and disputed concept (Miller et al., 2018). Futures literacy was recently recognized by the UNESCO (2020), as "the skill that allows people to better understand the role of the future in what they see and do", and just as with reading and writing, it is something that we can all do and should aspire to acquire. Therefore, it is about a new way to enrich the communication and educational process that comes from futures studies with which it shares the interest for developing more critical and creative ways to imagine, use, represent, and talk about the future and changes in general (Miller & Sandord, 2018). How, where, and when to acquire this skill are questions that are still unanswered (Bateman, 2012), where one of the objectives of the present study is to delve into this aspect.

As a summary, we propose five intersections between futures studies and education for the future or futures that emerge from the initial review of the literature:

1) Futures studies are not centred on predicting, nor is education about the future preparing us to be able to predict. There are different trends in futures studies that can crisscross. In general, what is sought is the study of multiple ideas and images about the future that allow us to create diverse scenarios or alternative narratives on which the students can reflect and prepare for what is yet to come.

2) Facing the future as open and predictable allows for a more hopeful approach that stimulates a positive disposition towards the future in the student and teacher. Thus, a future that, although complex and under construction, is presented as attractive and stimulating.

3) The present is a space for action, both individual and collective, in which to create thoughts and actions that will have an effect on the future. The education process oriented towards the future must prepare students to learn new ways to understand and act.

4) Futures studies are, in essence, multidisciplinary. Education for the future teaches students that the world, its problems, and its future solutions, are interconnected and cannot and should not be understood in isolated.

5) Futures literacy is presented as a key skill for futures studies. Its learning is still a matter of development and of interest for education research.

How to educate and why to educate for the future are matters that go beyond that which is purely school-related, and places us in a broader context. This is a matter of debate, which, just as the future, no futurist would keep closed. This article seeks to analyze this debate through a systematic review of the literature that links futures studies and education. For this, we will focus on the international scientific production in the last 10 years. Three objectives are posed:

- Describing the characteristics of research on futures studies related to education.
- Exploring the concepts of futures studies related to education.
- Analyzing the contributions of futures studies to the area of education.

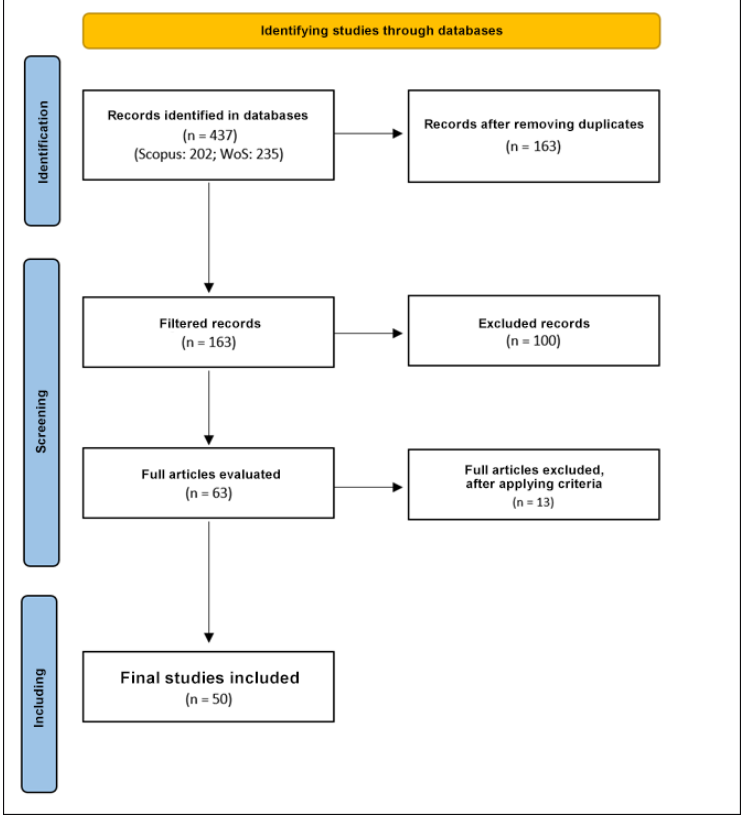
2. Method

For conducting the review, we utilized the PRISMA Declaration (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Moher et al., 2009; Page et al., 2021), one of the most utilized protocols in this type of study, which provides a checklist of the most important aspects to consider.

The keywords utilized for the search were "future studies", "futures studies", "future literacy" and "futures". The use of these terms was only considered in the English language, as it is a set standard in the search fields in any scientific journal, regardless of the source. These words serve to identify the articles that are directly related with futures studies. The selection of these words by the authors denotes their intention to place the work within this perspective. As an alternative, the concept "futures literacy" was included, as it is also a term that is directly associated with futures studies, especially in studies associated with education subjects. These words were included in their singular and plural forms, given that both forms can appear. As the Boolean operator to connect the words, we utilized "or", as the use of one concept

does not exclude the other, but instead enriches the search. As for the databases selected, these were the Web of Science and Scopus databases, as they include the highest-impact journals in the area of science, thus covering almost all the works that could potentially be analyzed. For both databases, the search was performed in the Keywords field (disregarding the search in the Abstract field, given the polysemy of the expression), considering the period from 2012 to 2022 (both included), thus encompassing a margin that was sufficiently broad and up-to-date. To make the search more specific, the type of publication was limited to articles, and in the case of the Scopus search, the exclusion criterion utilized was journals that were not part of the social sciences field.

Figure 1. Search and screening process



With the application of these criteria, 202 articles were initially found in Scopus, and 235 in the Web of Science, for a total of 437 articles. These records were imported in a systematic review management software program Rayyan, which allows searching for duplicates and the articles' classification. After the screening for repeats, a total of 163 articles were selected, which were later one by one examined manually to discard those that did not have a direct link with any education-related subject, with a total of 100 records excluded. When the copying of information started, another 13 works were identified as non-compliant, due to various causes. Thus, a total of 50 articles were found, meeting the requirements of being publications indexed in any of the two reference document databases mentioned, published in the last ten years, and in which futures studies were connected with education. Figure 1 shows the search and screening protocol followed, according to the PRISMA model (Moher et al., 2009). Likewise, the compliance with the checklist from the model was verified, aspects that are described through the present work.

The 50 articles selected were read, analyzed, and categorized by the authors considering the objectives, questions, and categories described in Table 1 (https://doi.org/10.6084/m9.figshare.19222785), in which we can find the links between these aspects. For their further review, the information was introduced

into an Excel file, after which the analysis of the results was performed, with the results presented in the following sections of the present article. It should be mentioned that given the limitations of the sample, the analysis of the results did not seek statistical representation, but instead it sought to work at the descriptive and idea-generation level that allow the identification of significant attributes of the literature, which will be discussed in the last section of the present work.

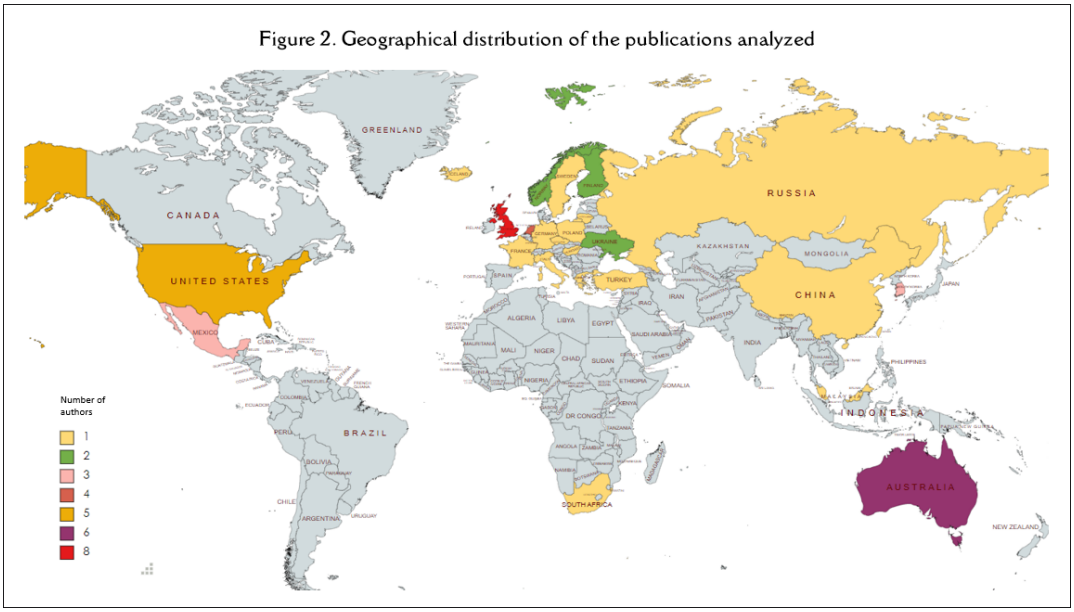
3. Results

In this section, we will describe the results related to the research questions established previously, and which are linked with the three objectives defined. The tools Tagcrowd (creation of word cloud), Mapchart (illustration of the geographical distribution), and Excel (for the graphical representations) were utilized.

P.1.1. What is the geographical distribution of the publications?

The greatest production of articles related with futures studies and education came from English-speaking countries. The United Kingdom (8 authors) was the country with the most publications on the subject, followed by Australia (6 authors), and the United States (5 authors). All the continents were well represented, except for South America. In Europe, aside from the United Kingdom, the Netherlands (4 authors) was also highlighted, followed by two Nordic countries, Norway (2 authors) and Finland (2 authors). Among the Spanish-speaking countries, only Mexico (3 authors) was represented in the present study. Nevertheless, except for three articles published in Korean, Afrikaans, and Russian, respectively, all the articles were published in English.

Figure 2. Geographical distribution of the publications analyzed



- P.1.2. What types of international collaborations exist?

The collaborations between authors are anecdotal. Although it was common for the articles to have more than one author, it was more frequent to find that they were from the same country and the same institution.

- P.1.3. In what journals are the articles published?

A variety of journals and subjects were found, among which we highlight publications in journals specialized in futures studies, a total of 54% of our sample. Among them, the journal "Futures" contributed with the most articles (18 out of 27). The journals specialized in education comprised 22%, and the non-specialized, 24%. The latter were journals about diverse subjects, mainly philosophy and literacy. Two monographs were identified which published articles related to futures studies and education; the first in 2012, in the journal "Futures" volume 44, number 1, entitled "Futures Education"; the second in a journal

specialized in education "International Journal of Educational Research", volume 61, entitled "Educational Futures: rhetoric, reality, and alternatives".

- P.1.4. What is the quality of the articles?

The articles analyzed were published in journals included in the two most important bibliographic databases (Scopus and Web of Science), thus guaranteeing their high quality. The journals with the highest impact factor were "Futures" (citescore 5.5 and impact factor 3.07, placed in the top 6% in the sociology and political science category in Scopus), and "International Journal of Educational Research" (citescore 3.1 and impact factor 1.972, found in the top 19% in the education category in Scopus). The articles in these journals were the highest represented in this review study.

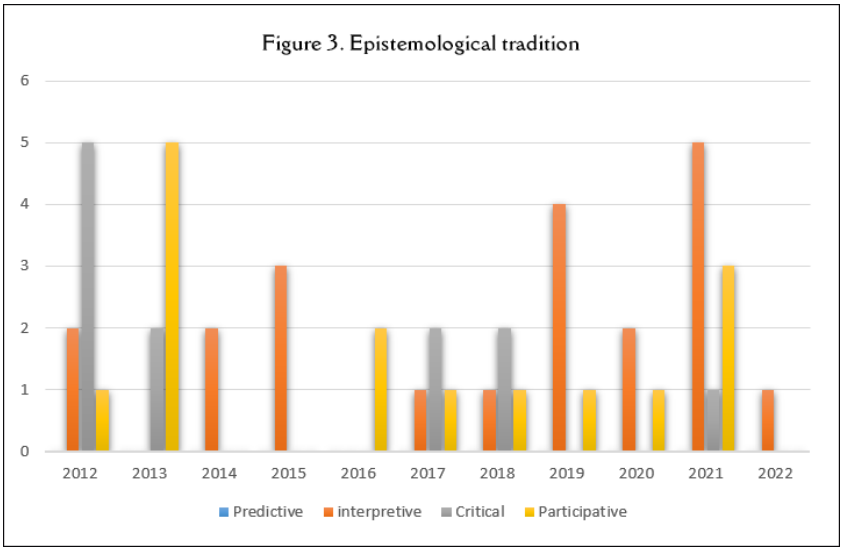
- P.1.5. What type of studies are conducted?

We found a balance between the theoretical (21) and empirical (18) articles, with both representing 76% of the sample analyzed. Although in a more modest manner, but also significant, articles oriented towards the practical were found (11). Among the articles analyzed, we did not find a systematic review, granting value to the review presented herein.

- P.2.1. In what epistemological approach are the studies found?

The interpretative approach predominated (21 articles), followed by the participative (15 articles) and critical (12 articles) ones. We could state that there is a certain balance between the three approaches, while the predictive approach did not appear in any of the articles. A clear tendency through time towards a specific tradition over another was not found, as shown in Figure 3.

Figure 3. Epistemological tradition



- P.2.2. What image of the future was underlined?

Although in many of the articles the image of the future was not clear, negative images were avoided, beyond the works such as those by McMain and Edwards-Schuth (2021), whose argument was developed starting with a dystopic image. Articles with predictable futures were not found either. The most common findings were articles that promoted an image of a future that is open (Inayatullah, 2013), hopeful (Haggstrom & Schmidt, 2021), plural (Mangnus et al., 2021), or under constant change (Kononiuk et al., 2021).

- P.2.3. How is multidisciplinarity developed?

All the journals in which all the articles analyzed in this review were found, were linked with the area of Social Sciences, which does not exclude their presence in others. Within it, the fields in which these were most common were Geography, Sociology, Development, and Political Sciences. Journals were also found in Arts and Humanities, as well as in Business management and accounting. Beyond the journals specialized in education, the rest did not seem to contemplate the area of education.

- P.2.4. What contexts, types, or levels of education do the articles deal with?

Studies that dealt with education in general predominated. Although there were also articles that were contextualized in non-formal and informal education, more of them focused on elements of formal education, especially those framed within higher education (university).

- P.2.5. What other concepts were included?

In the articles analyzed, the concepts that were most used as keywords were futures, and to a lesser degree, future, which along with foresight, would be the easiest to associate to futures studies (Figure 4). Other words also appeared, such as education, educational, learning, studies, university, literacy and pedagogy, which had direct links with educational aspects. Words that referred to educational elements such as schools, teachers, curriculum, or students, appeared minimally. Other concepts of interest that were highlighted were research, technology, citizenship, transformative, analysis, social, sustainability, design, and physical.

Figure 4. Frequency cloud of the keywords found in the articles

- P.3.1. What do futures studies contribute to education, and P.3.2. What pedagogical strategies were developed for education for the future?

A great part of the articles analyzed in this review were found in the university context. We found articles that examined experiences incorporating elements of futures studies in university programs of sciences and technology (Dolgopolovas & Dagiene, 2021), design (Berkan & Jonas, 2017), teacher training (Jang, 2019; Kazemier et al., 2021), business (Henderson et al., 2019; Pietraszewski, 2016), physical education (Voitovska & Tolochko, 2018), and geography (Pauw, 2015). These articles implemented strategies and methodologies that could be transferred to other programs such as workshops on the future, causal layered analysis, and laboratories on futures literacy. Kononiuk (2021) suggested that the addition of a futurist perspective of the curriculums in university programs contributes towards the development of a philosophy of sustainability, the learning of theories, methods of forecasting, and systems analysis, to propose innovations with social and environmental impact, the promotion of a long-term orientation, the improvement in the thinking about the future, and the implementation of futures literacy. Beyond the curricular changes, Zhukova and Bulgakova (2019) added that specialized spaces such as planetariums could be useful for incentivizing thinking about the future in university students. Another of the contributions that should be underlined is that by Kokshagina et al. (2021), which suggested the creation and use, by universities, of literacy laboratories in futures to analyze and re-guide the concept of

impact of the research studies. The purpose is to plan to create and produce a specific impact within an ethical and responsible process, to promote co-production, to delve into the collective imaginary about the future, and to encourage a critical and reflective sensibility.

The studies analyzed that focused on the primary and secondary school contexts, proposed a view of education for the future that is transformative, and that aside from preparing students to develop their own images of the future, also sought an idea of the future that is realistic and common. Thus, studies such as the one by Pouru-Mikkola and Wilenius (2021) suggest that learning about futures must consider three dimensions: (a) a cognitive dimension, which refers to the acquisition of knowledge about the future that allows understanding the principles of thinking about it, (b) an affective-emotional dimension that entails students developing a positive and personalized attitude towards the exploration of the future, and (c) an active dimension that implies the mobilization of the first two dimensions towards the search of avenues of action and change. Along this line, Facer (2016) underlines the responsibility of the educators so that this process is conducted with dialogue and in a collective manner, likewise emphasizing the need to work on the affective dimension, which has a strong presence in the discussions about the future. Working on the assimilation and inclusion of multiple imaginaries about the future in the classroom through futures literacy is presented in the literature as a main element of education for the future (Haggstrom & Schmidt, 2021; Hayward & Candy, 2017; Mangnus et al., 2021). The studies that focused on primary and secondary schools described a wide range of possibilities to teach about futures studies and to work on futures literacy in the classroom[2].

In the studies analyzed, we also found pedagogical experiences associated with futures studies that could be adapted to every level and context. Some examples are the historical-evolutionary approach (Rabinovich et al., 2021), futures workshop (Seongwon & Kang, 2014), place-based education (Sandford, 2013), and the design of scenarios or participatory fictions (Duggan et al., 2017; Pietraszewski, 2016). Due to their originality, we underline two initiatives such as the Teatro del devenir (Montero-Baena, 2017), which relates group-individual, artistic-creative, and multidisciplinary actions and thinking, and games such as that by Polak (Hayward & Candy, 2017), or Sarkar (Lianaki-Dedouli & Plouin, 2017), which allow fordelving into the different views of the future in the classroom, from the most positive to the most negative.

4. Discussion and conclusions

The studies that relate futures studies with education in the last ten years, although not abundant, help to configure a large space for discussion, in which we find an equilibrium between the theoretical and the practical. Many of these publications concentrate on specialized journals or monographs, which, although of high quality, make us question the interest for this subject outside this area, more specifically, within the education community. Geographically, there was an unequal production, which is certainly worrying, given that the less economically-developed areas do not have a voice in this debate. Along this line, it is necessary to reflect on new avenues of international collaboration that facilitate the broadening of the debate, to enrich it with new perspectives, and which will comply with the integrational, multicultural, and inclusive maxim that is demanded by the most critical approaches of futures studies. This does not mean that there is lack of interest in other countries for transferring ideas from futures studies to education, but that these do not have a great academic repercussion in their reality. Without this, it would be very difficult to create the weave that will allow for the effective integration of new ways to understand and educate about the future, into education policies, curricula, or teacher training programs. Works such as the present one, and those presented in this monograph from the Comunicar journal, enable bringing more diverse audiences closer to the contributions and possibilities of futures studies. Specifically, this review provides the Spanish-speaking world access to the international debate and a starting point from which to nurture subsequent studies. A body of literature is offered in which the images of the futures that predominate are open, plural, and hopeful, making it possible to construct new studies or plan pedagogical practices.

The transversality and multidisciplinarity that characterize the futures studies are also present in the literature linked to education. The predictive approach, which nurtures much of the current scientific knowledge, is abandoned to work from interpretive, participative, or critical perspectives, from which to

seek, without losing rigor or criteria, new ways to address and incorporate the subject of futures to the pedagogical debate and practice. From a futurist position, the relationship between different perspectives is not defined as antagonistic or in conflict, but an enriching communication or their overlap is preferred (Inayatullah, 1998; 2007). Likewise, a proposal is made to address the academic work on education subjects from different disciplines or areas, that in their most domesticated form, implies collaborations with other Social Sciences, but, in its more radical form, invites joint work with other types of disciplines and areas, among which dialogue is traditionally scarce. This invitation is found in the literature, but is hardly present in the research practice. What could an expert in robotics, environmental sciences, biotechnology, or astrophysics bring to the conversation about the future of education? The answers will perhaps surprise us and serve to open new ways to conceptualize education elements and processes.

In general lines, the futures studies contribute towards changing the way in which education is oriented towards the future, thus favoring the modernization and transformation of the pedagogic debate. On the one hand, Bateman (2012) warned that this contribution would be truly transforming if teacher training was improved, broadening their understanding of the future and questioning pre-established ideas and attitudes about teaching, and at the same time, re-shaping the curricula to incorporate elements that contribute towards a true futures literacy. The literature analyzed shows a commitment to this idea, at the conceptual, training, and curricular levels. For this, strategies and methods that allow working on futurist thinking in the classroom are developed; although they mostly focus on higher levels of education, others are found to be linked to other levels of education. It should be highlighted that the literature analyzed placed greater focus on professors, education theory, and the university context, as opposed to learning processes and the students in primary and secondary education. Beyond the merely pedagogical, alternatives were also presented to re-think research elements and education organization and training. To a lesser degree, we found interest among the researchers, to delve into what is referred to as informal education, with this pedagogical space having many possibilities, although these have yet to be exploited by education for the future researchers.

Similarly, Gidley (2012), Bodinet (2016), and Dahlin (2012) explain that futures studies provide the opportunity to incorporate new ways of thinking knowing that have recently emerged (post-humanism, new materialism, post-structuralism, transhumanism, post-colonialism, etc.) in educational plans. An ontological and epistemological starting point is thus established that is still to be explored, which helps us to construct a pedagogy about the future that is open and plural. A pedagogy in which, as explained by Facer (2016; 2019), the work of the educator is placed in a point in time that maintains the past, future, and present, in tension. With this, the educator acquires the ability to create educational situations in which to put different resources from the three different time points into play: the capability to imagine a future from a positive but multiple way, the capability of action in the present, and meeting with the historical resources of knowledge and experience. We must also add that one must not forget the affective resources, recognizing, tending to, and working with the emotions generated by the ideas and discussions about the future (generally related with emotions such as hope, fear, loss, desire, etc.). The change brought about by the re-orientation of education towards the future starting with the futurist tenets, and the multidisciplinarity it assumes, also implies an opportunity for re-enforcing other types of knowledge, which in the last few years, have operated on the margins of the curriculum, in a cross-sectional manner, or as second or third category subjects. These are mainly environmental education, education for citizenship/global citizenship, democratic education, education for social justice, or multicultural education. In a direct or indirect manner, these aspects of education are present in the articles analyzed in the present review, leaving an open door for their interlinking, and the emergence of new contributions or approaches.

Futures literacy is presented as a key element for bringing the ideas from futures studies closer to education. It is a concept on which much has been written in the past few years, with the presentation of both theoretical and practical contributions. One of the most explored elements in the literature is that of competences or capacities linked to futures literacy (Haggstrom & Schmidt, 2021; Kononiuk et al., 2021; Benavides-Rincón & Díaz-Domínguez, 2022). However, we are still dealing with a concept that is not clear, and there is a lack of tools that could be used to evaluate different practices and to determine levels of mastery (Karlsen, 2021). The debate about futures literacy goes further, and it is still open. It is a

type of literacy that is found within a broader communicative approach, an approach that includes, in its exploration, the teaching and learning of multimodal cultural and ideological elements, and which sits on a broad range of communicative practices (Valverde-Berrocoso et al., 2022). With all, it is understood that beyond acquiring a series of skills to talk about, represent, or imagine the future, futures literacy works on contextual and identity notions of students and teachers, and makes possible a type of multisensorial knowledge and perception of the temporal (which is not limited to learning that is merely cognitive), to finally promote the exploration of new ways of becoming committed to the world.

In addition to the implication of the futures studies highlighted in the present work, we must point out some of the associated limitations- on the one hand, the nature of the field of study, and on the other, the methodology used. There is a great diversity of elements that must be considered when addressing futures studies, and in the present study, we opted for focusing on different aspects such as the epistemological traditions of the publications, the educational context they referred to, and overall, to the attribution we make with respect to their contribution to pedagogical knowledge. However, this meta-research approach demands subjective components that favor a contextualized type of analysis, even though the parameters could be reviewed to delve into it from other perspectives. As for the methodological limitations, we must point out the difficulties in operationalizing the search parameters, given the polysemy of the base expression in this review (Future Studies), and the accurate selection of the publications that directly addressed this field and its link with the area of education. Also, we must add that other databases which could also house relevant studies were not considered.

In light of the data analyzed, we must conclude that it is only by learning to look towards the future in an open and positive manner towards new ways of knowing, understanding, and being, that we could truly solve and release the problems from the past. Problems that seem to continuously reproduce in present education. The future is yet to arrive, a future that, although always presented as singular, always comes in plural. An education for the futures that is nurtured on futures studies is a type of education that allows us to draw a sustainable future, in which the hopeless images that predominate in the media are positively counteracted by a way of relating uncertainty about the future with the agency we have available in the present. Thus, it is necessary for futures studies to promote new education policies, improve teachers' training, methodologies in inclusive classrooms, and the transformation of education centres. This is a complex challenge that requires a conceptual clarification, a predisposition towards change at different levels, and the ethical and professional commitment to a sustainable future.

Notes

[1] In this article, we opted to use the terms "estudios de futuros" and "alfabetización en futuros" given that they are closer to the translation in English, and the idea of plurality underlined in their definitions.

[2] The World Futures Studies Federation offers multiple pedagogical resources through their website to work on futures literacy and futures education: https://bit.ly/3JMFYDj.

Authors' Contribution

Idea, A.R., D.M., S.U.; Literature review (state of the art), D.M., A.R., D.F.; Methodology, D.M., S.U.; Data analysis, D.M., S.U.; Results, D.F., A.R.; Discussion and conclusions, D.M., S.U.; D.F., A.R.; Drafting (original draft), D.M., S.U.; Final revisions, D.F., A.R.

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Educating for a sustainable future through the Circular Economy: Citizen involvement and social change

Educar para un futuro sostenible a través de la Economía Circular: Implicación ciudadana y cambio social

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ABSTRACT

The climate crisis and the environmental emergency are a sign of uncertainty for the future of the planet. European and national educational directives establish the framework of action and the commitments that must be made by each agent to reach the new sustainable paradigm which is based on circularity. The school, as an institution of social transformation, faces a reproductive framework that feeds the consumer socio-economic structure, covering up the urgency of the problem. The aim is to identify the forces for change to improve the intervention mechanisms in the educational field in Spain aimed at fostering the involvement and the participation of young people. The qualitative methodology combines discourse analysis using Grounded Theory and prospective analysis using the scenario method. By means of a validated questionnaire, semi-structured interviews and focus groups are conducted with technicians and managers, trainers of trainers, teachers, and researchers (n=53). The discourse of the agents and legislation on education and sustainability are analysed to generate substantive theory. By means of the theorization obtained, drivers and constraints are identified, establishing a probability and impact matrix that allows for the visualization of three possible futures. It concludes with a set of recommendations to strengthen the desired scenario and to reduce the possibilities of the dystopian scenario.

RESUMEN

La crisis climática y la emergencia medioambiental auguran un futuro de incertidumbre para el planeta. Directivas europeas y nacionales educativas establecen los marcos de actuación y los compromisos que cada agente debe asumir para alcanzar el nuevo paradigma sostenible basado en la Economía Circular. La escuela, como institución de transformación social, enfrenta un marco reproductivo que alimenta la estructura socioeconómica consumista, encubriendo la urgencia de un problema acuciante que ha mostrado el límite de los recursos del planeta. El objetivo de la investigación es identificar las fuerzas de cambio para mejorar los mecanismos de intervención en el ámbito educativo en España orientados a fomentar la implicación y la participación social de los jóvenes. La metodología cualitativa combina el análisis de discurso empleando la Teoría Fundamentada y el análisis prospectivo mediante el método de escenarios. Por medio de un formulario validado, se realizan entrevistas semiestructuradas y focus group, a técnicos y directivos, formadores de formadores, docentes e investigadores (n=53). Se analiza el discurso de los agentes de la comunidad educativa y la legislación en materia educativa y sostenibilidad para generar una teorización sustantiva. A partir de esta, se identifican las fuerzas y limitadores, estableciendo una matriz de probabilidad e impacto que permite identificar tres futuros posibles. Se concluye con una batería de recomendaciones para fortalecer el escenario deseado y minorar las posibilidades del escenario distópico.

KEYWORDS | PALABRAS CLAVE

Qualitative research, social sustainability, curriculum design, discourse analysis, social change, schools.
Investigación cualitativa, sostenibilidad social, diseño curricular, análisis del discurso, cambio social, escuelas.

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1. Introduction and current situation

1.1. The role of the school in transitioning to a Circular Economy

Worrying about the future lets us shrug off the burden of worrying about the present (Confucio, 2017). The climate emergency and the need to adopt a systemic and global approach have been shaping the international agenda for decades (Linnér & Wibeck, 2017) and have highlighted the important role played by both the education system (Monroe et al. 2019) and ecomedia education (Bolin & Hamilton, 2018; López, 2019) as drivers of a process of global political and socioeconomic transformation. International treaties, such as the Agenda 2030 for Sustainable Development, which is the latest rung on the ladder (United Nations, 2022), have set forth collective commitments for helping build the future. Anchored in these commitments, the design of Europe's future has a vocation of sustainability. The European Green Deal (European Commission, 2019a), the Circular Economy Action Plan (European Commission, 2019b), the Habitat III New Urban Agenda (United Nations, 2020), along with strategies and programmes for action that, at national level in Spain, manifest as plans, such as the National Climate Change Adaptation Plan 2021-2030 (Government of Spain, 2021) and the Spanish Urban Agenda (Government of Spain, 2019). They have drawn the battle lines for building a future that transitions from the current paradigm of linear production and consumption, with its roots in materialism and neocolonialism (Stein et al, 2022), towards an ethically responsible and post-materialist Circular Economy (Lethone et al., 2019).

These directives and how they fit in politically with national legislation (García-Lupiola, 2019), from a polycentric viewpoint (Jordan et al., 2018), are establishing the official methods and resources needed to take decisive actions towards this transformation. Within this process, the School is an essential institution for educating generations of committed citizens, capable of becoming the perfect place for ongoing and holistic adaptation and for the desirable future (Szczepankiewicz et al. 2021), and one where offering sustainability training for teaching staff is crucial (Blanco-Portela et al., 2020; Collazo-Expósito & Geli, 2022).

The School is a place where students can develop the metacognitive processes that drive their reflective and critical thinking and dialogue (Magno, 2010) and evaluate their consumer habits (Santisteban-Fernández et al., 2011). A place for environmental militancy (Dunlop et al., 2021) that motivates them to participate and drive forward the global ecological transition starting with their local environment, demanding that target groups with the ability to roll out these changes on a larger scale (politicians, planners, managers and communicators) take immediate action and decisions (Novo, 2018). The School is a driver of change to reduce the gap of social awareness of this problem (Baiardi & Morana, 2021).

1.2. Educating for a sustainable future

"If all education is for the future, then when and where is the future explored within education?". This was a question asked by Hicks and Slaughter back in 1997. Education is the seed of a sustainable future. It's the cause and source of what will be, because it precedes all that is to happen. The power that it wields is passive in nature, because it could be, and has the ability to engender, the necessary change. This potential is anchored in the desideratum that societies have begun to reflect in their education laws, as pragmatic instruments of political action at two levels: governmental and institutional (Capella-Riera, 2004). With these rules, societies aspire, using lessons from the past, to improve the present, and envisage the future. This is done using an axiological approach, determined by the underlying interests, principles and values of a model educational policy (Matarranz, 2019). However, they are desperately hoping that there is also an active side to this power, because only in this way will it have the ability to transform the situation, for the better, "by virtue of its desire" (Aristóteles, 2013). But this requires commitment to promoting the identified pathways for change, establishing a binding obligation for envisaging the desirable common future.

Educational legislative frameworks, by their multidimensional nature, set out models for action. Hence the relevance of the policies that shape them (Brennan et al., 2021). They set out the framework for social action, encourage action by offering a reference framework for all agents, and shape the path of the future. The destination determines the path. Most recently in Spain, the guidelines established by the LOMCE (Education Quality Reform Act, Law 8/2013) and LOMLOE (Education Reform Act, Law 3/2020) have

offered differentiating approaches to the issue of the environment and sustainable development. The LOMCE draws on the OECD, promoting skills development and individual action in terms of "knowing" and "knowing how". The LOMLOE seeks to empower, from a European and UNESCO viewpoint, the forward-looking and participatory abilities of the collective, which requires a comprehensive overview of the educational goal of enabling students on a multi-dimensional level: knowing, knowing how, knowing how to be, and knowing how to coexist (Delors, 1996). The challenge facing educational politics is how to promote, starting with designing a global society that understands and takes action towards the climate emergency (Ripple et al., 2021), the principles of sustainable development in accordance with the Agenda 2030. Our awareness of the Great Derangement (Ghosh, 2016), and recognition of the impact that human activity has had on the Anthropocene (Crutzen & Stoermer, 2021), will help sever the link between human progress and domestication, and the silent destruction of a natural world that, as we have finally come to realise, is finite (Montagnino, 2020).

1.3. Aims

Actioning change implies an understanding of the framework and drivers of change (Wallis & Loy, 2021) and its resistors (Fritz et al., 2021). We investigate this concept with the practical aim of offering recommendations to take advantage of the opportunities represented for Schools by the new legislation designed to drive the Circular Economy, in order to foster a sustainable environmental future. The School needs to exploit the current momentum, where society finds itself at a crossroads, having understood the need to act (Carattini & Löschel, 2021) and overcome the inertia for social change by means of transformative education that learns from past mistakes (Acosta-Castellanos & Queiruga-Dios, 2021). We therefore established the following aims:

- A1. Use discourse analysis (technicians and managers, trainers of trainers, teachers, and researchers) to identify the drivers and resistors of change in order to improve mechanisms of intervention within the Spanish education system designed at fostering social involvement and participation among young people.
- A2. Define the possible future scenarios (undesirable, transitional, and desirable) based on how these various drivers, levers and resistors of change may evolve within the educational sector.

1.4. Hypotheses

- H1. The catalytic ability of a new participatory culture and social change directed towards sustainable development depend on the design of education policies and their conversion into real educational regulatory frameworks.
- H2. The efficacy of interventional plans and programmes in this field is related directly to coherence between the curricula designed by each of the various authorities, and the support and aid strategies introduced for their implementation and assessment.

2. Materials and methods

2.1. Methodological planning

In terms of epistemology, this research uses the paradigms of critical theory and interpretative theory (Habermas, 1981; Horkheimer, 2003). The study is inductive and uses Grounded Theory (Corbin & Strauss, 2015) and prospective and relational analysis (Inayatullah, 2019) based on structured techniques (Heuer & Pherson, 2015). It starts from the principle that, as a research subject, an analysis of vectors of change towards a Circular Economy, from an educational viewpoint, bears the characteristics of a complex social system: the sum of the parts reveals properties that do not exist in their individual components (Cardozo-Brum, 2011), which in turn exert a non-linear influence on the social system in general (Gutiérrez-Sánchez, 2000), and create a high level of uncertainty due to their fluid nature (Bauman, 2000).

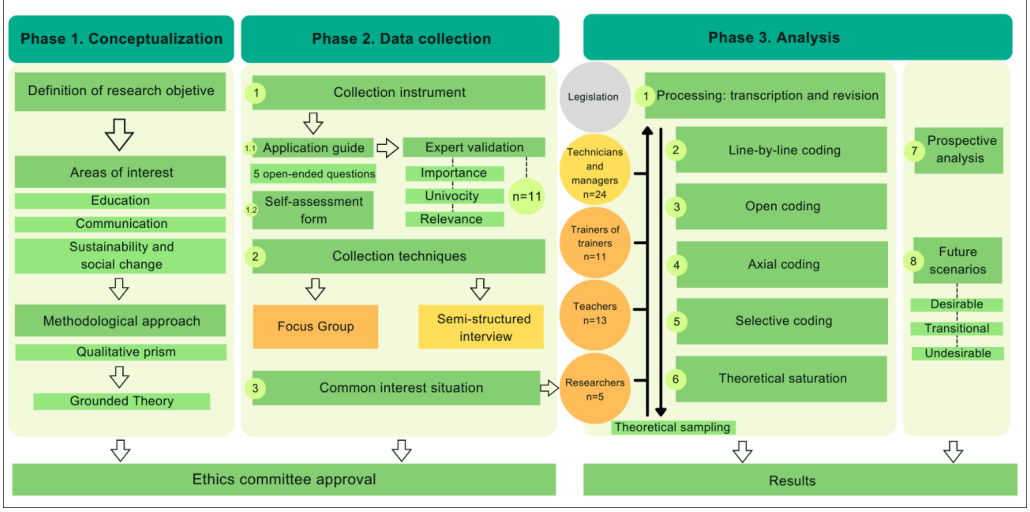
This mixed qualitative approach will allow us to understand and theorise about the aspects, properties, dimensions, and concepts surrounding the research subject, from the viewpoint upheld by Flick (2015) involving an analysis of specific cases, individualised temporally and spatially, and evaluated in their

particular context. First, we can use the procedural and relational aspects of Grounded Theory (Glaser, 1992) to design an initial basic theoretical model, one that is both substantive and situational (Elliott, 2000), by means of analysing verbal and textual data (Flick, 2004), and then in turn, to obtain a suitable understanding of the phenomenon in its context and its limits but without claiming to establish any formal theory (Escalante-Gómez, 2011). A scenario analysis (Inayatullah, 2020) is another useful method for estimating a plurality of futures (Schwartz, 1991) and making decisions about actions that are required in the present reality in order to achieve the desirable futures (Gary & von-der-Gracht, 2015).

2.2. Research tools and stages

The methodological design combines mixed data collection, processing and analysis methods (Figure 1).

Figure 1. Methodological design



The research interconnects education, communication, sustainability, and social change. The first step was to identify situations that, from a critical, qualitative and systematic perspective, could be used to determine the categories that would offer relevant and contextualised information.

We produced data collection guidelines in order to organise, validate, and homogenise the process (Carbonell-Alcocer et al., 2022a). They set out the approach and aims of the study, identifying participants, the data collection methods, and the ad hoc form design. Data were to be collected using interviews and focus groups, conducted both in person and remotely, which would be recorded for subsequent analysis. We used an online self-assessment form to gather sociodemographic and profile data from the experts and obtain their informed consent. The form contained five open-ended questions ranging from general to specific topics. It was approved by an expert panel (Escobar-Pérez & Cuervo-Martínez, 2008). Using an online form, ten Spanish education and communication experts verified the robustness and validity of the questionnaire in terms of importance, univocity, and relevance (Carbonell-Alcocer et al., 2022a).

The data collection process began from a place of common interest, in order to determine how many scenarios or situations should be explored to produce a theory, using the principles of Grounded Theory. We therefore attended a specialist Reduce, Reuse, and Recycle event[1], and obtained information from scientific experts specialising both in the efficient and innovative management of biowaste and in educommunicative awareness. Having identified the avenues to be prioritised in terms of obtaining the substantive information needed to generate a theory, we used systematic convenience sampling to select the informants from each of the groups. The sample (Table 1) was divided into four interest groups, for each of which we then selected the most suitable conversational data collection method based on their characteristics. The unit of analysis was the discourse of the various groups, together with the recitals of current Spanish legislation[2] on education and sustainability.

Table 1. Sample			
Group	**Subjects**	**Collection method**	**Format**
Technicians and managers	24	Semistructured interview	Video conference
Trainers of trainers	6	Focus group	Video conference
	5		Video conference
Teachers	5	Focus group	Video conference
	8		Video conference
Researchers	5	Focus group	Face-to-face
Total	**53**		

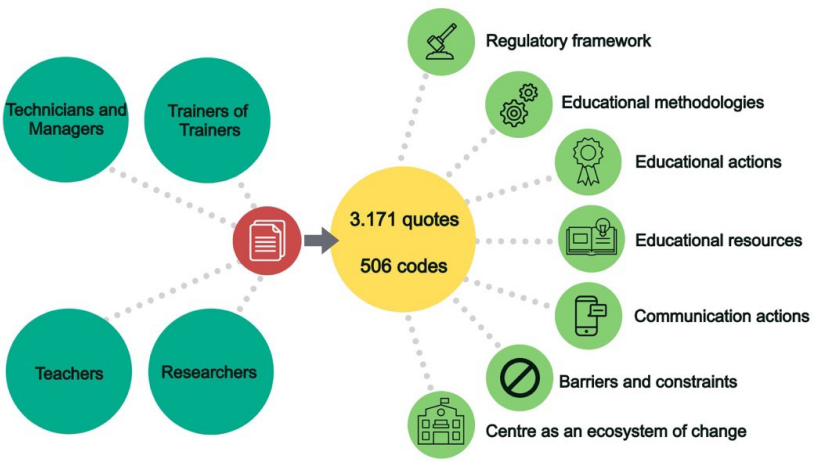
Data collection took place from November 2019 to December 2021, and it overlapped the analysis stage. The discourse of the Technicians & Managers group revealed opinions that diverged from those of the initial group and therefore, in order to achieve theoretical saturation, we expanded the sample to include experts from the Ministry of Education and Professional Training, and from the Education Boards of the 17 Autonomous Communities.

We used the software package sonix.ai to transcribe the recordings. These were reviewed in order to minute them, identify the speakers, and eliminate transcription erratas and errors (Sánchez & Revuelta, 2005). The analysis was conducted using Atlas.ti v.9.0. Using the resulting theorisation, we developed a prospective analysis using the scenario method (Godet & Roubelat, 1996), specifically the alternative futures method (Heuer & Pherson, 2015), applying a probability and impact matrix based on a desirability scale (Gary & von-der-Gracht, 2015). The probability/impact ratio for each cell in the table was determined using the results of the codification and co-occurrence analysis. This analysis resulted in three scenarios (desirable, transitional, and undesirable), and identified some of the underlying drivers and strengths that could determine how the situation would evolve.

3. Analysis and results

We identified 3,171 quotes and 506 structured codes in seven families (Figure 2). Given the scale and nature of the research, the analysis focused on the regulatory framework, educational actions, barriers and constraints, and the centre as an ecosystem of change. See the appendices for details of the sample, codes, and interactive diagrams (Carbonell-Alcocer et al., 2022b).

Figure 2. Families identified by the codification process



Each family was organised into core categories reflecting the needs and demands of each group. The Regulatory Framework family comprises four categories relating to the extent of content on sustainable development and climate change in laws and royal decrees, value of legislation, and curriculum configuration factors. The Educational Actions family covers five categories relating to effective education actions, limited education actions, ineffective education actions, forward-looking education actions, effects of actions, and agents of change. When presenting the results, we have included some quotes stated by

the informants, each quote having been selected for being particularly representative of the group's overall opinion.

3.1. Technicians and managers: Legislation as the cornerstone

Legislation does not contain enough content on sustainable development and climate change, and what content there is, is limited by the rigidity of the regulatory framework. Something akin to the "law of the jungle". Previous legislative frameworks have been characterised by insufficient and unsuitable consideration of the curriculum, limited to specific provisions for topics in specific subjects. At a time of regulatory reform, this group sees a lack of sufficient improvement in the legislative framework, insofar as the necessary content is not generalised in the recitals of the LOMLOE. Technicians and Managers are positive and hopeful when it comes to the new regulatory framework, although they highlight the need for it to be developed into Royal Decrees for the autonomous communities so that the changes will filter down to the classroom. This content must be addressed using a skills-based approach, in an integrated manner, horizontally across the entire curriculum. Real change takes time and requires self-awareness linked to an understanding of the problem and the adoption of responsible habits within society. We identified four levels with different scopes and propositions. The aim must be to ensure students are eco- and socially literate ("knowing"), encourage sustainable consumer habits ("doing" "being" and "coexisting"), and instil metacognitive processes ("coexisting").

The development of educational actions is limited by the desire of teachers and centres to put them into practice, thereby placing the burden of action on the shoulders of any teaching staff who are sensitive to the situation. Effective actions will occur in both the classroom and the centre. The challenges are to make the problem more visible, raise awareness of recycling, develop environmental education products, train teaching staff, make educational tools available to teachers, and foster changes in consumption models. The following actions were highlighted: visits to waste processing plants, creation of school gardens, and introduction of recycling bins. Specific interventional programmes formed the backbone of integrated centre-based actions that would pave the way for ongoing and systematic work to change perceptions within the consumption model.

Actions at centre- and classroom-level were considered limited in their effectiveness. These include actions for making children more mindful and aware of recycling through informal discussions and workshops run by teachers and companies, and introducing bins at centres. They were seen as limited due to their disparate and mechanistic nature and a lack of context. "Recycling is not the solution given the amount of waste we generate".

Forward-looking actions include the creation of royal, federal and autonomous legislative measures, establishing visible and permanent mechanisms for intervention and driving the creation of an ecosystem capable of generating coordinated actions. Teaching staff must be taught at all levels, both during their basic training and their continuous professional development, in how to educate in sustainable development. This will then filter down to the students, who are the decision-makers of the future, guaranteeing they receive appropriate education. Finally, the inclusion of training mechanisms would pave the way for interventions that promote the development of actions for encouraging metacognitive processes and, as a result, behavioural change. In order for centres to become drivers of change, they need to develop their own projects that get included in the centre's PEC (Centre Education Plan), and involve both management teams and the students beneath them.

3.2. Trainers of trainers: Training as a lever of change

Legislation is, in general, lacking, and fails to specify the necessary regulatory frameworks. Curricular coverage is inappropriate, vague and limited, leading to negative opinions of the current curriculum. However, the new regulatory framework is viewed positively, although there are reservations as to how it will now specifically filter down to the curriculum. The climate emergency and environment crisis mean that the curriculum should be tackled as a matter of urgency. The idea was raised as to the possibility of an ecosocial authority that could offer an integrated, practical, experience-based, and horizontal approach to every subject.

Intervention programmes at centres are viewed as effective, especially if they include training for teaching staff. These actions must be permanent and aimed at raising theoretical and practical awareness of recycling. However, they depend on the degree of interest in environmental issues, and rely on the willingness of the teaching centre and the particular context if they are to be implemented. "These topics have to be included and not left up to just anyone". Teaching staff must be able to understand and assimilate concepts relating to environmental education and sustainability, in order to replicate practical actions in their own centres and classrooms.

One-off actions are seen as limited and ineffectual, such as introducing recycling bins. Training for the teaching staff, at all levels, is viewed as a driver of change. Training for teachers in Environmental Education will allow for these topics to be covered in the classroom on a longitudinal, ongoing and permanent basis. Teacher training centres need to create programmes with specialised content and methodologies so that teaching staff can grasp the magnitude of the environmental challenge and translate it to their education centres.

3.3. Teachers: Centre-based actions as drivers of awareness

The school curriculum does not contain enough content on sustainable development and climate change. Coverage is lacking and limited to occasional lessons, depending on how the topic has been incorporated into the curriculum of each autonomous region. As regards to professional training, these topics are included for a few professions that have a direct link to the subject. This limited curricular focus and scope is associated with a negative view among teachers of the global handling of this content. However, this group was appreciative of the fact that the curriculum is set up to allow a cross-functional approach to these skills of "knowing", "doing", "being", and "coexisting".

They mentioned the introduction of recycling bins at centres, school gardens, knowing the classroom's environmental footprint and, to a greater extent, specific interventional programmes and visits to waste processing plants as effective educational actions. These could be introduced at centres on an ongoing basis, or they could take place externally in a single day. The aim would be to focus on changing the consumer model, waste collection, teacher training, and recycling awareness. Developing specific interventional programmes would increase recycling awareness and generate practical and permanent control mechanisms at the centre. Visits to waste processing plants would raise the visibility of the environmental problem, help raise awareness, and trigger behavioural change thanks to the emotional impact generated. "To the point of being aware and mindful of incorporating them into our daily lives and being able to collaborate with the environment". Implementation of these actions depends on the willingness of the centre and teachers, given the individual workload involved in organising them and the complexity of the issue. Informal discussions and one-off workshops at centres, aimed at raising awareness among children about recycling, are thought to have a limited effect because they usually lack context.

There is a desire for training mechanisms that include teacher training in environmental issues so that they can take effective actions in the classroom. In order to transform centres into ecosystems of change, there is a need for global educational projects that encourage collaboration with the social and economic environment, involving teachers, students, and their families as a whole.

3.4. Researchers: Using the local context for contemplation

Skills-based considerations require an interdisciplinary and cross-functional approach in order to strengthen curricular coverage of the skills of "being" and "coexisting". "This has to be dealt with from the outset, constantly, because only if they are reminded will they shape future behaviour". Due to the complexity of the issue, these topics have to be tackled from a local perspective, local to the centre, so that students can relate them to their daily lives and only then understand their global dimension. This will allow students to understand the problems, make commitments, and consider the implications.

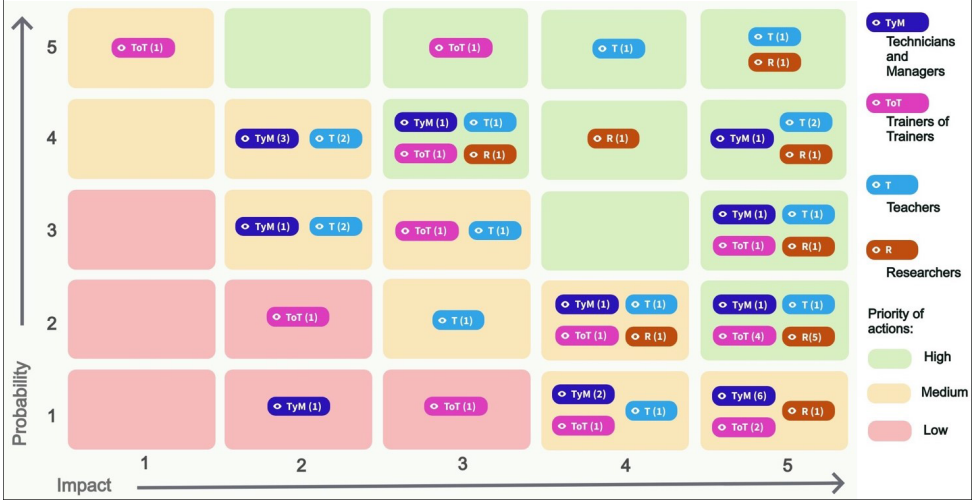
The centre and its surrounding area form part of the ecosystem for a change of model. For this reason, future actions must be coordinated and included into the Centre's PEC so that they can contribute to raising awareness and to the adoption of sustainable habits. Student training depends to a great extent on the Sustainable Development content of teacher training programmes, which should be linked to regional

and national frameworks. Inertia in the production and consumer society is generating huge resistance and hampering changes in individual and collective habits. Effective educational actions rely on the willingness of centres and the existence of teachers aware of the environmental problem.

3.5. Prospective analysis and future scenarios

A content and co-occurrence analysis between codes was used to determine the indicators, limiters and effects (Carbonell-Alcocer et al., 2022b) and generate the probability and impact matrix (Figure 3).

Figure 3. Probability and impact matrix



The probability and impact matrix offers three possible future scenarios:

1) Undesirable future. Scenario whereby the actions included in legislation and national and international frameworks are never realised. A negative situation in which the errors of the past are repeated, and all the willingness shown for a change of model is reduced to an ephemeral declaration of intent. The consumerist economic model continues to promote linear production. Educational practices do not lead to changes in consumer habits among educational agents, and specialist training in environmental education and the circular transition is highly unlikely. The centre is seen as an independent agent, isolated from its surroundings, where any actions depend on the goodwill of the centre and its teachers.

2) Transitional future. Scenario whereby legislation materialises in policies, measures and concrete actions. It represents the first steps towards responsible and sustainable consumerism. Frameworks for action incorporate the needs of the recipient groups, providing a staggered roll-out of resources to centres, at all levels of education. Institutional support makes it possible to set up organisational structures at centres that encourage collective knowledge of environmental issues.

3) Desirable future. Scenario whereby, thanks to the improvements seen in the transitional future, we achieve a potential model for educating in circularity and sustainability, making it easier to change the consumer habits of the entire education community. The education authorities, centres and teachers make a real commitment given the urgency of the environmental situation. The targets set by LOMLOE are met, and the curricula for every educational level are expanded to include content about education on sustainable development, Agenda 2030, and the Sustainable Development Goals.

There is a skills-based, cross-functional, and interdisciplinary approach to content, strengthening the concept of "being" in order to encourage contemplation and generate responsible habits. The centre becomes a cornerstone of the ecosystem to achieve a sustainable consumer model based on the Circular Economy. Stimulating teacher training programmes are developed along with action plans incorporated into the PEC, designed to protect the quality of education and teacher well-being. Centres have the human

and material resources to carry out local educational actions related to their particular surroundings, using active and experience-based methods.

4. Discussion and conclusions

We need conscientious, committed and active citizens. The emergency of the situation (Willis, 2020) requires an overhaul of consumer habits. In line with the Climate Change and Energy Transition Act, experts highlight the need for a more certain future, and a legal obligation that forces political action (Government of Spain, 2021). Students are the seeds of this deep-rooted change. They will become the decision-makers of tomorrow, but they already have the ability to affect consumer models by shrugging off their *affluenza* (De-Graaf, 2002) and demanding that target groups take action for immediate political change (Novo, 2018).

Our findings highlight the fact that educating students during a time of exogenous change, such as climate change, involves building a whole new culture (Heras-Hernández, 2016), one that reconnects our *Dasein*, our Heideggerian "existence" in a world based on the things surrounding us, with one that, like nature, marks our conditionality and the earthly order of our being. Change is needed so that we can plaster over the cracks in the world of today (Han, 2021). Educational policies and rules must make a concerted effort to incorporate content on environmental issues and sustainable development, allowing for flexibility in the curriculum and expanding upon an ecosocial, integral and cross-disciplinary approach, thus validating H1.

If we are to be able to implement this change from Schools, new habits must be built. It involves a long and ongoing process covering all the pillars of education: knowing, doing, being, and co-existing (Delors, 1996), in order to help foster the critical thinking that mobilises public involvement. This will mean reversing the core principles of a consumerist society, because it requires an individual sacrifice of the overriding desire to own goods and services (Baudrillard, 2009) which, in turn, needs coordinated action with systemic and organic support, not dependent on the willingness and strength of specific teachers or centres, and that incorporates students into this ecosystem of change (Wamsler, 2020).

Our results show that a successful outcome to this process will require (i) giving autonomy to centres and supporting them with human and material resources so that they can become drivers of change; (ii) encouraging them to connect with their local, social, and economic surroundings (Barrón-Ruiz & Muñoz-Rodríguez, 2019); (iii) offering global experiences that reveal the magnitude of the problem through experience-based learning (Magno, 2010) and encourage awareness with a commitment to reduce, reuse, and recycle (López, 2019); (iv) developing environmental education projects (Lethone et al., 2019); (v) providing teacher training (Collazo-Expósito & Geli, 2022; Blanco-Portela et al., 2020); or (vi) educating in responsible consumer habits (Trudel, 2019), all of which validate h2.

Change will rely on the ability to cast off old habits and adopt new ones. These new endogenous sustainable habits will have to be adopted through the constant repetition of actions, by which students will not only learn how to change their behaviour, but also their frames of reference (Amran et al., 2019) and cultural values (Tibbs, 2011). However, our results indicate that many educational actions are currently only isolated gestures (Abbati, 2019) which, although well-intentioned (EarthDay.org, 2022) are one-off and only have short-term effects. Experts agree that the School must encourage atomic habits: small and repeated day-to-day improvements which, although they may go unnoticed (Clear, 2019) are in fact transcendental to generate this ethical and global commitment towards a different way of acting and helping build the sustainable future we need.

The overwhelming consensus is that we need a systematic design that allows us to build these habits, some sort of a framework for practical and often unconscious familiarisation, whereby we learn through the processes of socialisation, that helps us reproduce the desired patterns of behaviour in a given context and situation (Bourdieu, 1997). We need to foster a "hexis", an active conditioning or disposition towards change in Aristotelian terms, and for this process, the social space represented by the School, as a place for learning social practices, has a crucial role for building historical/temporal awareness, placing individual and social actions into context and empowering young people to fulfil their potential, but also their unavoidable duty to act in the future (Santisteban-Fernández, 2010); a future that needs to be built on the climax of

uncertainty left to us by the COVID-19 pandemic (Tesar, 2021). The recommendations generated by this research (Carbonell-Alcocer et al., 2022c) offer a practical guide to help managers, technicians, trainers of trainers, teachers, and researchers tackle this challenge and continue the transition (Slaughter, 2003) towards a global consciousness that reconnects us with our environmental reality (Amran et al., 2019).

Notes

[1] "IV Digital Communication Seminar: raising awareness of Reduce, Reuse and Recycle", part of the BIOTRES-CM research project (BIOTRES-CM (S2018/EMT-4344).

[2] Law 7/2021 of 20 May 2021 on climate change and the energy transition. Law 2/2011 of 4 March 2011 on the sustainable economy. Law 8/2013 of 9 December 2013 for educational quality form. Law 3/2020 of 29 December 2020, amending Law 2/2006 of 3 May 2006 on Education. Press release on food waste (20/10/2021).

Authors' Contribution

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Design process for the generation of future education scenarios

El proceso de diseño para la generación de escenarios futuros educativos

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ABSTRACT

This paper brings together studies on the future and design methodologies to develop a novel proposal for prospective analysis in the field of education. We apply mixed research methods in combination with design methodologies to open up new routes for studying the evolution, impact and behaviour of trends in future scenarios. Our research is based on an analysis of qualitative data from secondary sources and interviews with experts, which we transform into quantitative data using fuzzy logic models applied to uncontrolled Internet data environments. Our goal is to verify the validity of the DEFLEXOR method, which addresses the need to identify educational opportunities based on future scenarios defined using megatrends detected in various fields. Our conclusions highlight that combining qualitative and quantitative approaches with the methodological principles of design thinking, together with automated calculations arising from creative reflection by experts, constitutes a powerful methodology for developing specific prospective studies.

RESUMEN

El presente trabajo relaciona los estudios sobre el futuro y la disciplina del diseño para plantear una propuesta novedosa de análisis prospectivo aplicado al campo de la educación. La exploración se sustenta en el empleo de métodos mixtos de investigación, que, combinados con metodologías propias del diseño, abren nuevas vías para estudiar la evolución, impacto y comportamiento de las tendencias en escenarios futuros. La investigación se fundamenta en el análisis de datos cualitativos, provenientes de fuentes secundarias y de entrevistas con expertos, que son transformados en datos cuantitativos mediante modelos matemáticos de lógica difusa aplicados a entornos de datos no controlados de Internet. El objetivo del estudio es verificar la validez del método DEFLEXOR, cuyo desarrollo responde a la necesidad de detectar oportunidades educativas basadas en escenarios de futuro, definidos a partir de megatendencias detectadas en varios campos, con el objeto de definir una oferta académica relevante para el diseño del futuro. Las conclusiones ponen en relieve que la unión de una perspectiva integradora de métodos cualitativos y cuantitativos con los principios metodológicos del design thinking, en convivencia con el uso de cálculos automatizados a partir de la reflexión creativa de expertos, constituye un poderoso constructo metodológico para el desarrollo concreto de estudios prospectivos.

KEYWORDS | PALABRAS CLAVE

Education, studies on the future, design, mixed methods, data mining, trends.
Educación, estudios sobre futuro, diseño, métodos mixtos, minería de datos, tendencias.

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1. Introduction

Trend analysis is the practice of gathering information to identify behavioural patterns. We achieve this by delving into the field of future studies (Decoufle, 1974; Schwartz, 1991; Godet, 2001; Mojica, 2005; Brown & Kuratko, 2015; Kuosa, 2010, 2016; Berenskoetter, 2011; Ito & Howe, 2016) – the theoretical and methodological underpinnings which are combined with conceptual analysis procedures (Meyer & Mackintosh, 1994) – supported by advanced automated learning techniques (Shavlik et al., 1990; Mohri et al., 2018). The overall goal is to conduct a design-based prospective analysis of trends that can be used as a tool for future studies. This new approach employs mixed research methods (Creswell, 2014, 2015; Ramírez-Montoya & Lugo-Ocando, 2020) in combination with design methodologies (Manzini & Coad, 2015) to create new routes for studying the evolution, impact and behaviour of trends in future scenarios.

In this approach, strategic decision-making requires the setting of different observation points to refine the responses to the research questions. The approach entails the application of the principles of design thinking (Visser, 2006; Dorst, 2011; Oxman, 2017), a method involving multi-stage analysis of the data gathered. It is effective in situations involving volatile information and a high degree of obsolescence. We integrate all these elements to demonstrate the importance of design-based methods in future studies. In this paper, we present the various components of our methodology, which we call DEFLEXOR (DEsign FLowing EXpansion Organism), we specify our research design, and we argue why the design thinking methodology is effective for achieving our research objectives. In that regard, we explain how qualitative and quantitative data mining and artificial intelligence models can be integrated in future studies. Lastly, we discuss the results of using the analysis tool for future studies in the field of education, and we provide our research conclusions.

2. Research design: Studies on the future and design

We sought to verify whether mixed-method design methodologies supported by fuzzy logic algorithms are valid in the field of studies on the future and, specifically, whether they are effective for prospective analysis in the field of education. We tested the validity of the DEFLEXOR method in the context of devising new education programmes at the European Design Institute (Istituto Europeo di Design, or IED). The IED teaches all disciplines related to design, visual communication, fashion and management and constitutes a large international network – originating in Italy – for training future professionals in all areas of design. We established the following research questions as the starting point for this study. The questions stem from the strategic goals set out by the IED management team in view of the need for an educational portfolio that responds to long term trends and changes:

- Do studies on the future combined with a design approach enable the generation of future scenarios?
- Do the scenarios enable us to envisage a design education programme 20 years ahead?
- Which specific academic programmes should be part of a future design scenario?
- Which professional competences are needed for the future of design?

In the following sections, we present the main features of our research design and we establish the foundation and context for the debate on the application of the DEFLEXOR methodology.

2.1. Participants

Twenty-four transdisciplinary, transgenerational professionals took part in the study. We ensured gender equality in our selection. The final selection comprised thirteen women and eleven men aged 23 to 65 working in the various design disciplines. Our selection criteria stipulated that the participating experts had to work with one or more areas of the school: design, visual arts, fashion and management. We analysed the curriculum to ensure it included live projects, to find evidence of continuous contact with the design world, and to verify the experts' involvement in the IED's educational programmes. Lastly, we sought the involvement of staff from the academic secretariat, the academic coordination team, the directorial team for the master's programme and the school's overall management team.

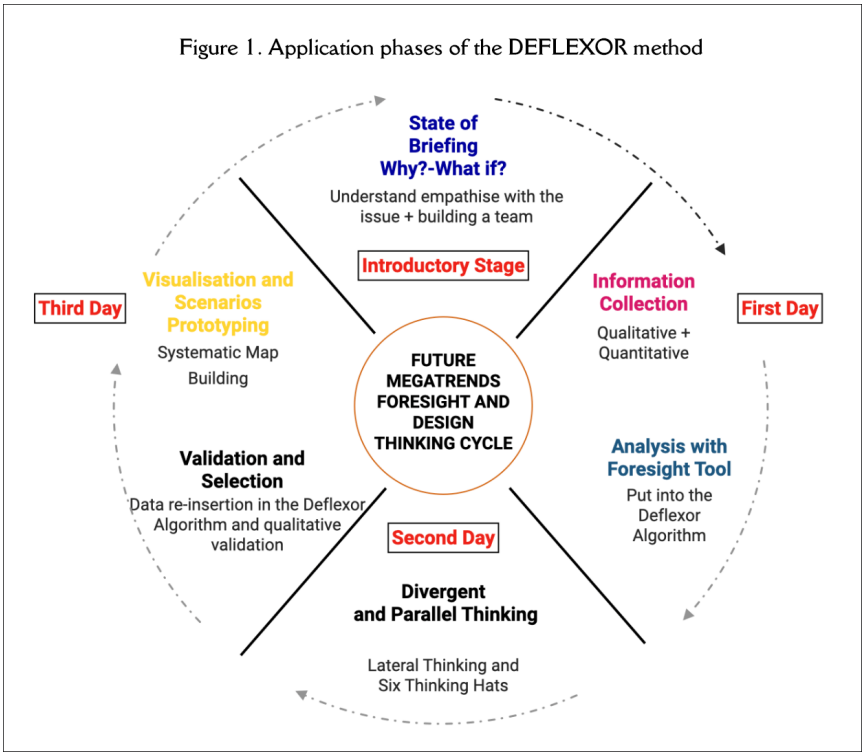
2.2. Research context

To foster teamwork and collaboration, we opted for three eight-hours, in-person workshops led by five experts in creative methodologies. This approach enabled the experts to share the same information in the same space. The workshop format ensured decisions were taken based on experience and information exchange in the various sessions. We expected to see a consensus based on cumulative knowledge. The workshops were designed around competences in research, critical and creative thinking, and collaboration.

2.3. Data sources and instruments

In terms of data sources, the workshop participants consulted the trend forecasts provided by the Worth Global Style Network (WGSN) in the IED library. The library has a specific collection on trends in both database and physical format. They also consulted the data platform of the World Economic Forum (WEF) to obtain trusted, reliable information. Furthermore, they conducted Internet research using specialist search engines such as Google Scholar, which provide a vast amount of trend reports and specialist literature on future studies (we developed this theme in the DEFLEXOR method). Lastly, they used the internal IED database of texts and images going back ten years on research projects in the different design disciplines.

Figure 1. Application phases of the DEFLEXOR method



In terms of data collection instruments, we employed various techniques. Firstly, the mind map technique with removable sticky notes yields a schematic representation of ideas beginning with the question "What next?" in the centre. Participants add their ideas, projecting outwards from the centre (the present) towards the future. We also used the Manual Thinking (Huber & Veldman, 2015) system of removable labels of different sizes, colours and shapes to connect different concepts. This is a particularly effective tool for visualising processes, contextualising ideas and ordering thoughts. Moreover, it facilitates teamwork and supports creativity, exploration, prioritisation, organisation and the prototyping of scenarios in a structured and dynamic way. We also used the dot-voting system in which a limited number of red voting dots (in our case ten) is distributed to participants who then place their red dots next to the sticky notes to indicate a preference for a specific theme (in this case, course topics). Participants vote individually

on ideas, trend characteristics, and any other element that requires prioritisation. Lastly, we installed the DEFLEXOR algorithm (see the methodology section) on various devices so that all workshop participants had access. As we will see further on, the algorithm helps determine the distance between the experts' ideas and suggestions, and their presence and relevance in external information sources.

3. DEFLEXOR methodology for studies on the future and design

Trend identification is a complex problem given the directional nature of trends and their oscillation over time. The trends we examine are not past events but predictions of what will happen at a specific time in the future (Vejlgaard, 2007). To study and analyse the nature of trends, we must apply new research methods. We propose a new methodology (Figure 1) for studies on the future supported by design methodologies as well as mixed research methods and mathematical tools which constitute an active and constantly changing body of knowledge.

We are convinced that design thinking and mixed digital research methods are the most appropriate techniques for studying and analysing trends in view of the temporal variation of trends and social behaviour (Lara-Navarra et al., 2018). According to Campbell and Fiske (1959), multiple research methods are necessary to identify trends and their variations since trends vary depending on societal needs. For that reason, a mixed research model is the most suitable approach to studying and analysing social behaviours (Pereira-Pérez, 2011).

3.1. Mixed methods

Research questions concerning trends must be studied and reviewed at different stages and be supported by both qualitative and quantitative evidence. The data obtained help interpret trend behaviour in multiple scenarios. When faced with diverse responses to the research questions, it is important to conduct methodological triangulation with various types of information (Jick, 1979). There is a sufficient body of literature supporting the use of mixed methods to create research instruments that facilitate a better understanding of the subject of our research (Creswell & Plano-Clark, 2011; Curry & Nunez-Smith, 2015; Morse & Niehaus, 2009; O'Halloran et al., 2018).

Studying the nature of mixed research methods reveals a common factor: the need to define a process, such as a set of staged research operations to analyse the problem from different points of view (Dagnino et al., 2020). For example, the mixed research model proposed by Creswell (2014; 2015) includes Multi Stage Evaluation Design, a process with specific phases for development, testing, implementation and making improvements (Creswell, 2015; Guetterman et al., 2015). O'Halloran et al. (2018) state that mixed models use qualitative and quantitative data to evaluate needs, conceptualise, develop instruments, implement and test, monitor and refine. The approaches by Creswell (2014; 2015) and O'Halloran et al. (2018) pave the way for innovation in the field of future studies and design thinking.

3.2. Design Thinking

The theories and concepts of design thinking are widely accepted by the scientific community and there are numerous important papers supporting design thinking research methods (Lawson, 1980; Rowe, 1987). Design thinking is a process of exploration and creative strategising (Dorst, 2011; Visser, 2006; Oxman, 2017). The process defined by Oxman (2017) involves the search for a solution, exploration, emergence of a solution, reflection, modification, refinement, adaptation and media (this last term involves concepts such as algorithm design and artificial intelligence) (Bonamiet et al., 2020).

In certain cases, mixed research models require the use of computational techniques to combine qualitative and quantitative data. Our model is based on the approach by O'Halloran et al. (2018), in which the concept of data integration is expanded to include the transformation of qualitative data into quantitative data to enable data mining and visualisation. In this sense, design thinking coincides with the processes described by Creswell (2015) and O'Halloran et al. (2018) for mixed research methods.

3.3. Mathematical tool

In this section, we describe the unique mathematical tool that constitutes the technical branch of our method. Though we are dealing with a completely formal structure, we must apply a conceptual analysis

to the prospective system to help ascertain the semantic relationships. In the initial steps (points one and two below), we provide a method for translating semantic ideas into vectors – the basic elements of linear algebra. In the steps that follow, we adopt a mathematical structure based on the fuzzy set theory. This enables us to implement automated learning tools in metric spaces to calculate the prospective indices that make our procedure unique.

1) Defining the semantic axes of the prospective system. Conceptual analysis enables us to define the main terms (sentences, words, abbreviations) that define the expected direction in future studies. A group of experts used qualitative methods to define these terms and create a comprehensive relationship structure for building the conceptual universe that would help us represent future trends. We will refer to this structure as the "universe", and the letter "n" to refer to the number of elements. Conceptual analysis methods are necessary in this step, once the semantic structure is established. This system becomes a mathematical object underpinning the future analysis. If we reason by analogy, the terms become an (algebraic) basis (n) in which trends are represented using what we call semantic projections.

2) Describing the semantic projections in mathematical terms. They may be defined in different ways, depending on the objective of the prospective analysis. In broad terms, they are real numbers in the interval [0,1] indicating the degree of semantic coincidence of the terms that describe the new trend we wish to verify, and of each of the n elements in the universe, ordered in a finite sequence. The vector defined by these numbers – following the order of the basis – provides the mathematical representation of the trend in our universe.

We will use an example to explain how to define a semantic projection. Suppose we have a term "x" in a universe (e.g. the word "sustainable") and a new term "y" that successfully describes a possible trend we wish to analyse (e.g. "wood") to study the suitability of certain materials in furniture design within the Green Economy. We define the projection P_x(y) by measuring the number of times the term "x" appears "close" to the term "y" and divide it by the total number of times the term "y" appears in all secondary sources. Here, "close" means fewer than ten positions in the text between the terms "x" and "y" in any sentence from the database containing both "x" and "y".

Therefore, "y" is represented by the n-dimensional vector y ->(P_x_1(y), P_x_n(y)), which can be understood as follows: each projection P_x(y) provides the "degree of belonging" of the term to the semantic group defined by "x", which is a fuzzy set. For more examples and a full explanation of how to define these projections, see Manetti et al. (2021).

3.4. Information sources

The principal problem we face is how to obtain data to feed the system (Martínez-Martínez & Lara-Navarra, 2014). In fact, this is the main innovation of our mathematical tool. The first challenge is how to obtain information beyond what is available from Google apps. Google is a good source; Google Trends and Google Ads provide many tools for analysing trends. However, other sources can ensure the independence of the prospective results. We therefore propose the use of alternative search engines such as Yahoo, Bing or Qwant, and non-profit databases such as Dbpedia and WikiData.

We needed to establish the distances between terms to define the conceptual universe for our analysis. To do so, we required a metric space comprising our selected concepts for defining the semantic projections of the terms describing the trends we wish to analyse. For some of our objectives, data extraction using Wikidata is therefore more interesting. Wikidata was unveiled by the Wikimedia foundation in 2012 as a structured collaborative knowledge base (Saorín & Pastor-Sánchez, 2018). DbPedia and Wikidata are actually complementary projects that have advantages and disadvantages depending on the desired objective. We prefer to use both, together with YAGO (Yet Another Great Ontology), developed by the Max Planck Institute for Informatics (Suchanek et al., 2007). These tools use linked open data and enable us to find information and contextualise the results more intensively.

Wikidata allows us to compare information in accordance with semantic web standards (Frisendal, 2012), in turn enabling us to generate conceptual maps of the terms that interest us, translate these to SKOS or OWL and visualise them as RDF graphs. The resulting knowledge graphs support a mathematical procedure for calculating distances.

These distances are defined using graph metrics. On a given graph (comprising nodes and vertices or edges), the distance between two nodes is the minimum of the sum of all the edges of all possible routes joining the two nodes. Including weights in the sum of these edges improves the description of the semantic relationships represented in the graph.This is the most systematic and complete way of defining the conceptual universe in each case. The same methodology can be applied to other linguistic or conceptual structures or to databases of concepts that can be used for defining distances. However, this is not the only way to define our universes, or metric spaces. For example, the graphs available from Twitter, Instagram or LinkedIn can be used in the same way to construct metric spaces for defining semantic projections. This would provide a broader view of what is happening in the various parts of the Internet, enable us to build complementary metric structures and, by comparing these, allow us to analyse the authenticity of the results.

4. Results and discussion

We applied the DEFLEXOR method in response to a series of challenges set by the IED management team, including how to use techniques of studies on the future to develop the institute's portfolio and ensure it adds value in the employment and social spheres as well as internationally. We held three workshops on consecutive days to meet our research objective. On the first day, we analysed whether studies on the future combined with design methodologies can generate prospective scenarios for the challenges set. In that regard, the workshop participants conducted research in secondary digital and physical sources from the IED library (Figure 2). They also established the fields of interest for the research questions and the search formulas. The group of experts established six specific fields of interest: society, the environment, technology, culture, demographics and the market. After this, the group developed the strategies for searching for information, working together to find the best response to the research question. After selecting the best strategies, the session continued with reading in groups. This was followed by a debate in which speakers argued why certain sources should be included in the process of creating the future study into education at the IED. The workshop resulted in the selection of the main strategic consulting and business reports, e.g. McKinsey, Fijord, Deloitte and the World Economic Forum.

The workshop on the second day looked primarily at how creativity can help develop scenarios for the IED's programme 20 years from now. Participants worked with the Six Thinking Hats method (De Bono, 2000). Lateral thinking is a technique for approaching problems and situations imaginatively and creatively. The first task was to organise the information from the day before to establish the scenarios. This resulted in six macrofields of action: science and technology; laws and market; cities and nature; demographics and people; politics and society; and art, spare time and culture. The group also suggested twelve megatrends: changing business volatility; global economic power shift; alternative energies transition; rapid urbanisation; demographic boom; population ageing; governance system crisis; climate change crisis; standardisation; personalisation; accelerating technologies and material adoption (particularly in relation to artificial intelligence); and hyperconnectivity.

At the beginning of the session, we established that the thinking processes would take place synchronously to prevent information loss, encourage the flow of ideas, and in turn activate lateral thinking via lesser-known strategies to prevent rational, logical thinking and the trends common to vertical thinking. The sessions began with a perception phase followed by processing, development and creation of ideas around the concepts generated in the session.

The use of a creative methodology resulted in conceptual leaps that altered perception patterns. This facilitated innovative conceptual pathways that generated suggestions for new education programmes in the different areas and disciplines within the IED's master's department. The key point here was to approach conventional ideas and concepts with an attitude of openness to unconventional alternatives.

We took the qualitative data provided by the experts and fed it into the algorithm, programmed with the six macrofields and the new programme name. The algorithm used external sources to determine the intensity of the relationship between the macrofield of action and the academic proposal and allowed us to ascertain whether the result of the semantic projection was near to, or far from, the experts' own thinking.

Figure 2. One of the workshop sessions

Note. IED.

Of the alignment of macrofields and academic proposals, 62% had a high coincidence, 17% showed more disagreement than agreement, and 21% showed high disagreement. The experts then indicated whether they would modify their perception of the future or maintain their selected projection. The outcome was 126 academic programmes linked to macrofields and megatrends.

On the third day, the group compiled the information generated during the previous days. At this point, given the difficulties in managing such a large volume of information, we decided to apply visualisation and prototyping techniques. A visualisation tool would facilitate an overall view while enabling us to identify possible unpopulated or unbalanced areas and ensure the entire master's programme area was covered. Our objective here was to refine the suggestions for new education programmes to anticipate the training needs of emerging professional roles in the design world. In the prototyping phase, the 126 proposals were placed within the established macrofields and linked to megatrends. We observed an unbalanced distribution of education programmes with respect to the zones on the map, which are: the economic macrofield (laws and the market); the environment macrofield (cities and nature); the demography macrofield (individual and collective dimensions); the politics and society macrofield; the culture macrofield (focus on art and free time); and the science and technology macrofield.

The algorithm linked each of these macrofields with two contrasting megatrends. The experts involved on the third day worked in groups to define future scenarios for each of the six macrofields and megatrends. The outcome was as follows:

- Scenario 1: Design and new business models. Megatrends: changing business volatility and global economic power shift. Macrofield: laws and market.
- Scenario 2: Design and sustainable development. Megatrends: alternative energies transition and rapid urbanisation. Macrofield: natural environment.
- Scenario 3: Design and wellbeing. Megatrends: demographic boom and population ageing. Macrofield: demography.
- Scenario 4. Design and social impact. Megatrends: governance system crisis and climate change crisis. Macrofield: politics and society.

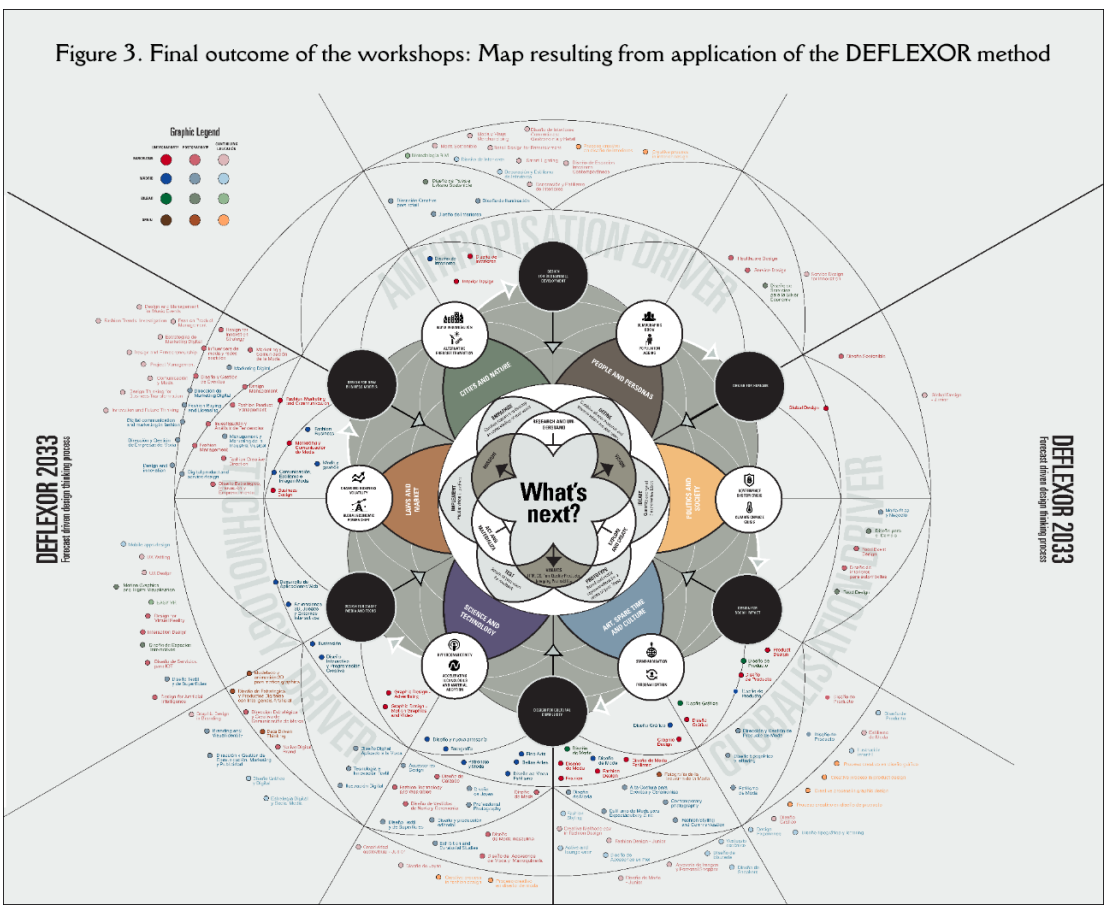
- Scenario 5: Design and diversity inclusion and understanding cultural complexity. *Megatrends*: standardisation and personalisation. *Macrofield*: culture.
- Scenario 6: Design and the humanisation of digital media and smart technology. *Megatrends*: accelerating technologies and material adoption (particularly in relation to artificial intelligence) and hyperconnectivity. *Macrofield*: technology.

We created the visualisation for the resulting 126 academic proposals by aligning them based on the semantic relationship with the macrofields and megatrends. The overall visualisation of the existing programmes generated a debate supported by lateral and parallel thinking techniques (divergent and convergent).

The debate concluded with the selection of six academic programmes that would be incorporated into the IED's advanced training portfolio. Application of the DEFLEXOR method resulted in the following programmes being proposed: *Master's Degree in Design for Artificial Intelligence; Master's Degree in Virtual reality; Master's Degree in Urban Environment and Mobility; Master's Degree in Fashion Technology and Wearables; Master's Degree in Service Design for Healthcare;* and *Master's Degree in Sustainable Design and Social Impact.*

To complete the process, we used the algorithm to conduct a final check of the proposed academic programmes to refine their relevance in relation to the megatrends and macrotrends on the map (Figure 3). The use of visualisation techniques in this phase created a new product in the form of a map illustrating the discussions between the experts attending the workshops. The map also provides a foundation for future innovative strategising sessions around the institution's education portfolio.

Figure 3. Final outcome of the workshops: Map resulting from application of the DEFLEXOR method



5. Conclusions

The use of mixed qualitative and quantitative methods based on the design thinking methodology and supported by an algorithm is a useful tool for studies on the future, since it enables the generation of robust and effective future scenarios. The learning generated in the workshops on the DEFLEXOR method had a positive impact, generating a solid information base comprising 126 specific proposals covering each of the proposed objectives. Visualisation played a key role; an overall view of a universe of macrotrends and megatrends arranged around a question (in this case, the IED's education portfolio) and linked to the idea that the design process facilitates a better understanding of the interconnections between the various phenomena at play and the degree of relevance of these connections.

An open investigation using secondary sources and applying the DEFLEXOR algorithm fits effectively with the divergent and convergent phases of the Double Diamond design thinking process. In the conversion and selection phases, the algorithm prompts discussion and acts as a selector. Applying the algorithm generates a solid base of organised information and a common denominator which is open to receiving possible new qualitative information from the secondary sources, enabling us to envisage a design education portfolio 20 years ahead. Using the map to visualise the base informational framework generated by the algorithm and the research work is also important in the creative thinking and ideas generation phase, in that it provides inspiration and prompts new ideas and concepts. In this method, the map simplifies the complexity without losing it. Application of the algorithm ensures control over the information in accordance with the parameters established by the program. In an increasingly technological and digital world, it also equips designers with a tool to support decision-making when using large volumes of data generated by the Internet and social networks to develop the products and services of the future.

Studies on the future with new methodologies constitute a change in paradigm and are influencing the present and future of the professional design sector. Educators in the design world need to take these into account, while design professionals should look to integrate studies on the future into their project development process. This is a decisive moment in the history of humanity. We are facing a range of social, political, cultural, economic, environmental and scientific challenges. Amid these disruptive mutations, our attempts to understand how the world works and how to create transformation from innovation should avoid a deterministic and linear view of the future. We require new tools for interpreting evolutionary phenomena so that we leave the door open to the possibility of modelling and creating not just the most likely futures, but the best alternative futures to provide sustainable solutions.

Authors' Contribution

Idea, A.M., P.L.N., J.S.N.; literature review (state of the art), A.M., P.L.N.; methodology, A.M., P.L.N., J.S.N.; data analysis, A.M., P.L.N.; results, A.M., P.L.N., J.S.N.; discussion and conclusions, A.M., P.L.N., J.S.N.; writing (first draft), A.M., P.L.N.; final review, A.M., P.L.N., J.S.N.; project design and sponsorship, P.L.N., J.S.N.

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Futures education: Curriculum and educational practices in Australia, Spain, and Chile

Educación para el futuro: Currículo y prácticas educativas en Australia, España y Chile

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ABSTRACT

The images of the future among young people have been conditioned by the stories present in the media, films, books, and also in school. Educational curriculums are made up of a selection of knowledge that privileges some ways of understanding the future over others. Young people often imagine a future that is in economic, social, and/or climate crisis. However, they also imagine a bright future for themselves, detached from the future they imagine for society. In this article, we present a qualitative analysis of the curriculums of Australia, Spain, and Chile, together with interviews with teachers from these countries. We investigate the presence and absence of futures education in these curriculums, their degree of development regarding futures education, and make a first analysis of the influence of futures education in schools. To do this we identify four dimensions: situate in time, anticipate, imagine alternative futures, and social action. The results show that, while the Australian curriculum explicitly includes education for the future, the Spanish and Chilean curriculum include it only tangentially. In addition, the socio-cultural context of schools and the will of the teaching staff are elements that determine the implementation of futures education in the school context.

RESUMEN

Diversos estudios nos indican que las imágenes del futuro que tienen los jóvenes están condicionadas por los relatos presentes en los medios de comunicación, las películas, los libros y también en la escuela. Los currículos educativos incluyen una selección de contenidos que privilegian unas formas de entender el futuro por encima de otras. Los jóvenes suelen representar un futuro en crisis económica, social y/o climática. Sin embargo, estos imaginan para sí mismos un futuro brillante, totalmente desligado del futuro de la sociedad. En este artículo presentamos un análisis cualitativo de carácter descriptivo e interpretativo de los currículos de Australia, España y Chile, junto con entrevistas a docentes de estos países, para estudiar la presencia y ausencia de la educación para el futuro en sus planes de estudios, así como su grado de desarrollo, y hacer un primer análisis de la influencia de la educación para el futuro en las escuelas. Para ello identificamos cuatro dimensiones: situar en el tiempo, anticipar, imaginar futuros alternativos y actuar socialmente. Los resultados muestran que, mientras que el currículo australiano incluye de forma explícita la educación para el futuro, el currículo español y chileno la incluyen solo de forma tangencial. Además, el contexto sociocultural del centro y la voluntad del profesorado son elementos que determinan el desarrollo de la educación para el futuro en la escuela.

KEYWORDS | PALABRAS CLAVE

Acting socially, curriculum, primary education, secondary education, futures education, critical thinking.
Actuar socialmente, currículo, educación primaria, educación secundaria, educación futura, pensamiento crítico.

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1. Introduction

In recent years, several studies indicate that most of the population perceives that the future will be worse than the present (Franceschelli & Keating; 2018; Ipsos-Mori, 2020: 16). One of the possible explanations is the influence of hegemonic narratives about the future on citizenship. These stories, present in the media, in film productions, in literature, and even in curricular materials (Anguera & Santisteban, 2016; Gidley, 2004) depict a future of economic, social, and climate crisis. Studies carried out with young people support the same thesis. However, we must differentiate young people's expectations about the future of society and their personal future. In this sense, several studies show that, while young people agree that the future of society, or their generation, will be worse than the present, they have hopes in their personal future, disassociating it from the global future (Anguera & Santisteban, 2016; Arnett, 2000; Franceschelli & Keating, 2018). A study conducted by the Kairos future-foundation with 22,000 young people between the ages of 16 and 29 shows that, while 32% of young Europeans and 54.1% of young Americans consider that a bright personal future awaits them, only 8.1% and 17.9% respectively, think the same for their society (Galland, 2008). In the same vein, Patterson et al. (2007), and Patterson and Forbes (2012) show that young people consider that in the medium term they will have a stable job, a family, and a home. Even young people in serious difficulty are optimistic about their personal future and rely on hard work to achieve their goals (Evans, 2002; Franceschelli & Keating, 2018).

Several studies argue that the hope in hard work to build a personal future disconnected from a socioeconomic structure in crisis is one of the narratives of neoliberalism, narratives that are on the rise and that weaken the sense of social relevance and favor individualization (Beck, 2007; Franceschelli & Keating, 2018; Galland, 2008; Hicks, 2004; Silva, 2013). While general trends in young people's images of the future are similar, studies tell us that these have certain variations from country to country (Galland, 2008; Ipsos-Mori, 2020; Stellinger & Wintrebert, 2008). These variations have historically been attributed to factors such as the cultural context or the socioeconomic conditions of each country, however, we also know that institutional narratives are a major factor in the construction of images of the future (Evans, 2002).

2. Futures education

Although education for the future has gained space in curriculums in different countries (Gidley & Hampson, 2005), debates on educational policies are still framed by the same belief system, as if we were preparing students to live in a future that reflects the same society in which we live right now (Giroux, 2013; 2017). The impact that the curriculum has on students to think about alternative futures has to do with the fact that the curriculums are composed of a selection of knowledge (Pinar, 2012). This selection necessarily favors some views of the past and present over others, which influences the way students think about the future. Futures education proposes that educational programs should not contain any element that is not justified by a future perspective. To do this, the curricular objectives must be projected towards the future and not towards the past, and the contents and competencies regarding citizenship must be designed so that they can be used in personal and collective life to build shared futures.

Through questioning the future, as well as through the analysis of emerging problems and their scenarios, it is possible to reflect on the present and open the possibility of new futures (Inayatullah, 2002; 2008; Poli, 2018). Future education proposes that children and young people are the ones who formulate and debate the possible futures, promoting contexts in which they are involved in the realization of alternative futures (Inayatullah, 2018). For this, one of the keys is for children and young people to become familiar with and use a variety of concepts and tools to develop the capacity for foresight and anticipation.

Futures education seeks to introduce changes in the way we think about the future, this involves awakening temporal consciousness (developing skills to critically analyze the past, present, and future), producing and imagining narratives of the future, and focusing on the ability to build future prospects to act in the present, thus ceasing to conceive the future as an abstract category so that it becomes an active social category (Gidley, 2004; Medina-Vásquez, 2020; Miller, 2018; Slaughter, 2012). Based on Inayatullah (2008) and Gidley (2004) we define four dimensions that allow us to identify the elements

of futures education: 1) situating in time; 2) anticipation; 3) imagining alternative futures; and 4) acting socially. The dimensions described above served to systematically analyze the presence and absence of futures education and how it is developed in the national curriculums of Australia, Spain, and Chile. They also allowed us to analyze teachers' narratives to understand how the curriculums are translated into educational practices.

2.1. Situating in time

The study of the past should include that of the present and future to prepare children and young people to actively participate in the construction of their personal and social future through the development of historical thinking (Pagès, 2019). In this regard, taking into account the challenges posed by current societies, Guldi and Armitage (2016) point out that it is necessary to establish a relationship between the past, present, and future as a guide to project those future paths that best suit students. In this sense, the first dimension we propose is based on the first pillar of future studies, proposed by Inayatullah (2008). This dimension seeks to understand our human temporality and establish relationships between past, present, and future to guide the construction and reconstruction of the images of the future. In future education it is essential to establish relationships between the three categories of human temporality, understanding the past as memory and remembrance, the present as the instant and the near history, and the future as the prospective (Santisteban, 2007). This dialectical relationship between the past, present, and future is fundamental to understand that the knowledge of the past allows us to live a personal and social reality that responds to who we are and what we want to be (Escribano, 2021).

2.2. Anticipating

Future education raises the need to solve the problems of the future through anticipatory actions that connect the future in an explicit way with the resolution of problems of the present. The moment we question the future and analyze emerging problems and scenarios, we can anticipate and imagine possible new futures (Wildman & Inayatullah, 1996). The second dimension is anticipation and it is based on the second pillar of future studies proposed by Inayatullah (2008). This dimension includes all the elements that allow problems to be identified before they are too big or difficult to solve. It also allows us to go beyond the immediate consequences of present problems, trying to anticipate their evolution in the medium and long term, in what Inayatullah calls the wheel of futures (Inayatullah, 2008). This dimension is also consistent with the idea of probable future originally proposed by Galtung (1982) and adapted by Gidley (2004). According to this author, the probable future is studied from the analysis of global and ecological trends, it is predictive and aims at making generalizations and extrapolations. Hutchinson (1992) suggests that isolated work based on the probable future often leads to reductionist ideas that pose a future in crisis and without alternatives.

2.3. Imagining alternative futures

Imagining alternative futures involves deductively predicting possible futures (Gidley, 2004). While in everyday discourse we usually talk about the future, imagining alternative futures is about imagining a plurality of futures and understanding the worldviews and myths that underlie them (Inayatullah, 2008; Gidley, 2004; Milojevic & Inayatullah, 2018). Franceschelli and Keating (2018) show how, while young people may be optimistic about their abilities to shape their future, their creative potential to think about it is limited by the molds of the neoliberal society in which they live. From this perspective, imagining alternative futures requires leaving aside our certainties about the present and what the future will be like. Inayatullah (2020) argues that it is necessary that the approach of future education focuses on engaging citizens to create anticipatory democratic systems, thinking about the future to rethink and act on the present. In this sense, students must be prepared to be citizens in a society where the future is uncertain and not predetermined. By posing the challenge of facing a future full of uncertainties rather than certainties, thinking about alternative futures expands the creative potential to act on the present. By rethinking the present, we act on the alternative futures that are to come (Inayatullah, 2018). Hicks (2004) stresses the need for individuals and groups to be able to envision more hopeful and positive futures. In this sense, peace education can contribute to the development of empowering images of more hopeful futures.

2.4. Acting socially

The future is built from the decisions and actions we take. This necessarily implies thinking and acting on the present and assuming responsibilities to introduce transformation processes (Wildman & Inayatullah, 1996). These visions of anticipation are fundamental and give individuals and social groups optimism about the possibilities of change (Inayatullah, 2008; Santisteban & Anguera, 2014).

As a component of transformation in the study of futures, the social action dimension is conceived as an active process in which the future is constantly created through practice. From this perspective, understanding the future is a step after anticipation as, in addition to the will to act, there is the need to become aware and develop creative and metacognitive thinking skills to define and project the future in the direction of the desired objectives. In this phase of action, the future is directed towards the desirable, which makes the future different from the past or the present (Masini, 1994).

3. Method

This study aims at identifying the presence and degree of development of futures education in the curriculums of several countries. In this paper, we present the first results for Australia, Spain, and Chile, comparing them and identifying how they are characterized. To do so, the dimensions of future educations based on the proposals of Gidley (2004) and Inayatullah (2008) and developed in the theoretical framework are used. The data obtained from the curriculum analysis are complemented by interviews with teachers from the different countries studied. This qualitative data allows a first analysis of the educational reality of each one of the countries.

Table 1 summarizes the documents analyzed and details some of the characteristics of the teachers interviewed. We selected documents that are equivalent in the three countries and teachers who have a stable track record in primary or secondary education in the field of social sciences and a broad knowledge of the educational reality of the country.

Table 1. Curricula analyzed and the interviewees' profiles

	Australia	Spain	Chile
Curricula			
Primary education	Australian Curriculum Foundation-10.	Royal Decree 126/2014 Primary Education Curriculum.	Curricular program of basic education and curricular bases from 1st to 6th grade.
Secondary education		Royal Decree 1105/2014 Secondary Education Curriculum.	Curriculum of secondary education, curricular bases from 7th grade to 2nd year of high school and from 3rd to 4th year of high school.
Participants			
Primary education	Primary education teacher and principal of a public high school in South Australia.	Early childhood and primary education teacher. Quality coordinator of an educational center and teacher instructor at the university.	Basic education teacher with a specialty in History and Social Sciences.
Secondary education	Secondary education teacher in the areas of English, Humanities and Social Sciences. This participant worked on the design of the Australian curriculum.	PhD. in law, philosophy, and letters, and also a Geography and History teacher at the secondary education level.	Secondary school teacher in History and Social Sciences.

In the first phase of the research, we analyzed the curricula based on a series of codes that we extracted from the dimensions of futures education (Table 2). They represent different characteristics within each of the dimensions analyzed. Considering these codes, we conducted a thematic analysis of the content of the curricula to study to what extent, and how, they include futures education.

Table 2. Codes linked to the dimensions of futures education

Situating in time	Anticipation	Imagining alternative futures	Acting socially
Change and continuity Development Future History Past Period Present Sequence Time	Anticipate Changes Imagine Predict Challenge Risk Sustainability	Alternative Degrowth Futures Imagine Utopia	Social action Decide Participate Transform Vote

In the second phase of the research, we selected six social sciences teachers, since, after a first quantitative survey, we determined that it is in this area where more elements of future education are identified. The criteria for the selection of participants are as follows:

- Choice of one primary education and one secondary education teacher for each one of the countries.
- A notable career in primary or secondary education in the field of social sciences.
- Broad knowledge of the educational reality of the country.

In addition, priority was given to those teachers to whom we had access and who were predisposed to participate in this research. At all times, the research with participants has been done based on the ethical regulations established by the corresponding countries, as well as the universities of the authors of this study. In this phase of the research, we used semi-structured interviews that were built based on the results obtained in the first phase of the investigation. The questions posed to participants, which serve as the driving axis of the interview, are the following:

1) Beyond the official curriculum, do you think that in the day-to-day of schools, the past and the present are analyzed with a critical perspective and with a projection toward the future? How is it carried out?

2) Do you think students are being taught to anticipate potential future problems? What kind of problems?

3) Do you work in the classroom with the premise that there are possible, probable, and preferable futures? In what way?

4) Are participation, action, and social transformation encouraged in schools? What lines of action are promoted?

5) Do you think that your country's education system is committed to education for the future? Do you think this type of education takes place in most schools?

The analysis of the responses was also carried out based on the codes and dimensions used in the first phase. Finally, the results obtained for the three countries were compared using the dimensions of futures education as a structuring element of the study, identifying, and making a critical analysis of the similarities and differences between them. The results obtained allow us to make a first approximation to the case of futures education for the curricula of Australia, Spain, and Chile, in addition to offering a first vision of the situation of education on the future in various countries of the world, which should lay the foundations for further studies in these and other countries.

4. Results

4.1. Situating in time

For the Australian national curriculum, we identified elements that denote a study of the past and the present with a critical perspective and with a projection toward the future. An example of this is found in the very preamble to the Humanities and Social Sciences learning area: "[t]he humanities and social sciences have a historical and contemporary focus, from personal to global contexts, and consider challenges for the future" (Australian Curriculum, Assessment and Reporting Authority [ACARA], n.d.: 17). The teachers interviewed suggest that in primary and secondary education the analysis of historical time is developed from a critical perspective depending on the socio-cultural context of the school. While in schools where most students are white and middle class, a sense of conformity to the current state of the world predominates, in multicultural schools, with indigenous students and students from other countries, there is a greater interest in analyzing the past and imagining a new future, although they claim that "the analysis is occurring too slowly for schools to meet the demands [of society]." (Australian primary school teacher).

The situation in Spain has different nuances. The curriculum focuses on the preparation of students for the exercise of citizenship, so they can participate in the economic, social, and cultural life of the country and adapt to situations of change. As in Australia, it is in Social Sciences, Geography, and History where this preparation is developed, although from an uncritical perspective, promoting "[...] the ability to temporarily order some historical facts and other relevant facts using the basic notions of succession, duration, and simultaneity" (Royal Decree 126/2014: 22). This approach remotely allows for the establishment of relationships between past and present and does not explicitly develop future education. Teachers who were interviewed support the same thesis and point out that it is not usual

to reflect on the past in secondary education, in addition, "what is sought is precisely to flee from the present" (secondary school teacher from Spain). On the other hand, in primary education, strategies such as "thinking routines [...] make students have a critical thinking that helps them in their future and analyzes the past" (primary school teacher from Spain).

The Chilean case is similar to the Spanish one. The aspects related to this dimension are worked from an uncritical perspective. An example is found in one of the learning objectives of 1st grade, which promotes teaching to "sequence events and activities of daily, personal, and family life, using relative categories of a temporary location, such as before, after; yesterday, today, tomorrow; day, night; this year, last year, next year" (p. 153). This is also the case for the learning objectives of 5th grade, among which we find "representing and interpreting chronological sequences and events of the past through timelines, distinguishing periods" (Chilean Ministry of Education, 2019: 168). The teachers interviewed show their concern about this situation in primary and secondary education. They affirm that "the labor burden and the pressure of standardized tests leave little and nothing to generate instances of criticism of reality" (primary school teacher from Chile). They agree that if initiatives to study the past, present, and future critically occur, they have their origin in the teaching staff.

4.2. Anticipating

The elements that we consider typical of this dimension of analysis have little presence in the curricula analyzed. The national curriculum in which we most identified the presence of this dimension was the Australian curriculum, especially in the areas of Humanities and Social Sciences and Technologies. This curriculum aims at developing the capacity to make informed predictions about the future, for example, in the inquiries and skills to be developed in the seventh year: "discussing the consequences of decisions (for example, economic, business, civic or personal decisions), considering alternative responses and predicting the potential effect of those responses" (ACARA, n.d.: 140). Regarding Technologies, we also found the idea of predicting. For example, in the content descriptors for the years 9 and 10 of the Design and Technologies branch we found the objective of "constructing scenarios of how the future may unfold (forecasting) and what impacts there may be for society and particular groups, and back casting from preferred futures" (ACARA, n.d.: 716). However, the teachers interviewed consider that the opportunities to anticipate future events are limited since the development of other skills and the learning of other contents such as language and mathematics are considered more important. In addition, they limit themselves to making predictions about financial and environmental problems, or even about the academic path and the profession that students will have in the future.

In the case of the Spanish curriculum, the dimension of "anticipation" is not present in any of the areas and subjects. As in the previous dimension, only curricular elements related to the environment and sustainable development are present, both in primary and secondary education, which, to a certain extent, implies prevention and anticipation. However, the purpose of these contents is that students understand the idea of sustainable development and its implications and there is no development of competencies to anticipate or predict problems and make sustainable development effective. The teachers interviewed consider that "this preventive work from my point of view is not yet addressed" (secondary school teacher from Spain) although they affirm that they do carry it out in a personal capacity. In addition, as in the case of Australia, it is limited to "environmental, social education ... and above all [to preparation] for professions that have not yet been invented" (primary school teacher from Spain).

Similarly, the Chilean curriculum does not include objectives or contents that, explicitly, allow this dimension to be developed. We could only find some related ideas. For example, concerning democratic education, it is worth highlighting the learning objective 3 in the 3rd grade which proposes "[r]eflect personally and in groups on risks to democracy in Chile and the world, such as the phenomenon of political disaffection, inequality, corruption, drug trafficking, violence, among others" (Chilean Ministry of Education, 2019: 61). The concept of assessing risk implies anticipating possible threats to Chilean society and democracy. The teachers interviewed agree that "possible future problems related to our future as a society or the problems that directly concern students in their daily reality (gender, migration, environmental, etc.), [...] are not addressed from an institutional point of view" (primary school teacher

from Chile). However, they affirm that in the day-to-day school "the problems that are discussed are those relevant to their local and global reality; politics, citizenship, feminism, economy, environment, gender, etc." (high school teacher from Chile). They argue that working from problems "makes students glimpse what of the above is happening in their context or may eventually happen" (high school teacher from Chile).

4.3. Imagining alternative futures

The third dimension of futures education is the least present in the national curricula analyzed. However, its presence shows how many educational systems focus on futures education, how they incorporate it tangentially, and how they omit it. The Australian national curriculum explicitly incorporates futures education by translating the idea that there are possible, probable, and preferable futures, especially in the areas of Humanities and Social Sciences and Technologies. In the HyCS, the idea that there are multiple possible futures and that we must act in the present to project ourselves into the future is continually present. One of the most explicit paragraphs is found in the inquiries and skills to be developed for the 4th grade:

forecasting a probable future and a preferred future relating to an environmental, local government or cultural issue (for example, developing a futures scenario of what oceans will be like if humans continue to allow waste plastic to enter waterways, and a preferred scenario of what oceans would be like if plastics were to be replaced by degradable materials) (ACARA, n.d.: 86).

For the area of technologies, creating preferable futures is one of the central ideas. The preamble states that "[a]s students progress through the Technologies curriculum, they will begin to identify possible and probable futures, and their preferences for the future" (ACARA, n.d.: 625). The teachers interviewed agree that this dimension is taught in schools, since it is part of the Australian curriculum not only in Humanities and Social Sciences but also in Technology and Natural Sciences. They consider that it would be desirable to include in this proposal the development goals of the United Nations as the backbone of this dimension, since it would be "a perfect framework to unite the different parts of the school and try to make children understand sustainable development" (secondary school teacher from Australia). However, they also try not to convey an overly pessimistic view of the future.

In the Spanish curriculum, no elements that allow teachers to educate towards imagining alternative futures were found in any of the areas or subjects. However, interviewed teachers suggest that in primary education " learning through challenges helps to see different paths and different solutions to the same problem" (primary school teacher from Spain) since at this educational stage "the necessary tools are given to be able to face their future through critical thinking, creativity, originality [...]" (primary school teacher from Spain). On the other hand, in secondary education, the teacher interviewed reassured that, generally, this dimension is not addressed.

Finally, for the Chilean case, the presence of this dimension is scarce in the curriculum. We highlight an objective that seeks to develop such work, such as objective 7 of the 3rd grade: "[d]istinguish political, economic and socio-cultural relations that configure the territory at different scales, proposing alternatives to advance in social and environmental justice" (Chilean Ministry of Education, 2019: 61). In such frameworks, in addition to the process of distinction that students are asked to do, they are required to formulate alternative proposals in order to transform spaces of social and environmental justice, all of which should be led by faculty. Similar to other dimensions, the development of this dimension depends on the teaching staff. In the interviews, Chilean teachers consider that developing this type of content "starts from the personal motivation of the teacher" (primary school teacher from Chile). For this task, they have resources beyond the curriculum, for example, "textbooks" and "training instances" (secondary school teacher from Chile) that focus on helping to "redefine and rethink the world in which we live" (secondary school teacher from Chile).

4.4. Acting socially

The Australian national curriculum includes concepts linked to this dimension such as acting, participating, and deciding, especially in Humanities and Social Sciences, but also in all other areas, to a lesser extent. The idea of participating is initially linked to the community: "[h]ow can I participate in

my community?" (ACARA, n.d.: 75), and as the courses progress it expands to more global dimensions by promoting "the capacities and dispositions to participate in the civic life of their nation at a local, regional and global level and as individuals in a globalised world" (ACARA, n.d.: 341). In the area of Technologies, decision-making is also addressed generally: "[s]tudents are given new opportunities to clarify their thinking, creativity, analysis, problem solving, and decision making" (ACARA, n.d.: 696), although it does not delve into how these objectives are put into practice. In the Australian curriculum, the learning objectives linked to this dimension are shortly described and leave room for deinstitutionalized and critical forms of participation. The teachers interviewed say that schools talk a lot about "the voice of the students" (high school teacher from Australia) although they consider that the student leaders may "not be representative of the body of students" (high school teacher from Australia). There are also students and faculty initiatives of social participation in the form of protests and demands.

In the case of the Spanish curriculum, the learning objectives focus on teaching students to participate in the future in the society of which they are part. A minimalist vision of democracy is proposed, limited to participation through voting. In addition, no content or methods are explicit that allow students to develop skills for action and social transformation. An example of this is found in the primary education curriculum in which the objective is defined as "[p]articipate in group activities adopting a responsible, constructive, and supportive behavior, respecting the basic principles of democratic functioning" (RD 126/2014: 23). In the same vein, the teachers interviewed agree that institutional actions such as the constitution day holiday, or the working women's day, are encouraged in a very global way. In addition, the democratic functioning of the schools is promoted with the election of class delegates, participation in the school board, and, sometimes, meetings of delegates are held with a member of the school management. Finally, social transformation is only conveyed punctually through service learning.

For the Chilean case, we could only find this dimension in some objectives for the 3rd and 4th grades and exclusively in the area of education for citizenship. For example, objective two of 4th grade suggests to "[p]articipate in a co-responsible and ethical way in the search for strategies and solutions to challenges, problems and conflicts in various scales, which involve harmonizing development, democracy, equity, and sustainability" (Chilean Ministry of Education, 2019: 62). Objective eight of the 3rd grade is worth mentioning: "[p]articipate in different school instances of democratic exercise, recognizing the need to socially organize life in community, in order to strengthen a healthy coexistence that protects fundamental freedoms and the common good" (p. 61). The little presence of this dimension in the curriculum is critically analyzed by the teachers interviewed, who consider that: "the decisions of the students are not binding for the structuring of school norms. [...] Starting from this reality, what can be taught about participation, action and social transformation is only an empty discourse that lacks application (primary school teacher from Chile). In the same vein, they consider that the time they have and the curriculum itself are limiting elements to promoting this dimension.

5. Discussion and conclusions

The results show that the curricula analyzed privilege some stories about the future over others, since they are made up of a selection of contents with an underlying ideology (Pinar, 2012). While the Australian curriculum promotes the study of the past and present with a projection into the future, in Spain and Chile the curriculum does not include a critical treatment of history or the present, perhaps because the recent past of both countries is a controversial issue. Similarly, the proposal to anticipate future problems is explicitly developed in the Australian curriculum while in the Spanish curriculum it is only addressed tangentially, from the study of the environment and sustainable development.

In the case of Chile, the promotion of futures education is only done timidly, anticipating the possible risks to its democratic system. Thinking about alternative futures is an idea that was only identified in the Australian curriculum, especially focused on technology and environmental issues. For the Chilean curriculum, this perspective is present tangentially, promoting that students propose alternatives in favor of social and environmental justice. On the other hand, in the Spanish curriculum, this dimension is not present. Finally, participation and acting socially are part of the curriculum of the three countries studied. In Australia, participation is promoted from the local to the global, although the curriculum offers few tools

to put it into practice. In Spain and Chile, the type of participation is based on democratic institutions and, at school, on the established decision-making and assembly bodies, as well as on specific service-learning initiatives.

In Spain and Chile, it is up to teachers to adopt a critical perspective and encourage students to establish relationships between present, past, and future (Pagès, 2019). The teachers interviewed suggest that, in the classes in Australia and Spain, prediction is taught by focusing on the labor market, reflecting a neoliberal ideology in educational practices, which can contribute to young people detaching a global future in crisis, from their academic and professional future (Beck, 2007; Franceschelli & Keating, 2018; Galland, 2008; Silva, 2013). On the other hand, in Chile, relevant present and future social problems are discussed, only due to the initiative of some teachers. Finally, in Australia, participation actions that are not institutionalized are promoted through demonstrations and protests. However, it depends largely on teachers and the social context of the school.

The analysis of the curricula made it possible to identify clear variations between them, regarding future education (Galland, 2008; Ipsos-Mori, 2020; Stellinger & Wintrebert, 2008). We highlight the scarce presence of future education in the curricula of Spain and Chile, while in Australia, its presence is explicit and is one of the backbones of its curricular proposal. These variations are relevant because they impact the creation of images of the future of young people (Evans, 2002). In some cases, curriculums are limited to treating the future from an environmental perspective and for sustainable development, as indicated in the study by Hicks (2002), without offering young people effective ways of social transformation, which can lead to discouragement, hopelessness, and imagining a future in crisis (Anguera & Santisteban, 2016). There is evidence to suggest that the role of teachers is decisive in understanding the presence and absence of future education, its degree of development, and the nuances it acquires. New avenues of research are opening up in this regard, which should allow us to understand what the development stage of future education in schools is, thus to decide, together, what future we build.

Authors' Contribution

Idea, J.C; Literature review (state of the art), J.C., C.E, R.S., J.M; Methodology, J.C; Data analysis, J.C., C.E., R.S., J.M; Results, J.C., C.E., R.S., J.M; Discussion and conclusions, J.C.; Writing (original draft), J.C., C.E., R.S., J.M; Final revisions, J.C., C.E, R.S., J.M; Project design and funding, J.C., C.E.

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Imagination, education for the future and democratic culture: Educational policies in the Iberian Peninsula

Imaginación, educación para el futuro y cultura democrática: Políticas educativas en la Península Ibérica

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ABSTRACT

In a historical moment, where the future is considered a threat, it seems highly relevant to teach the ability to imagine desirable futures. Education for the Future (EF), from the Anglo-Saxon tradition, represents a reference to give a response to negative images about the idea of the future. The competences for democratic culture defined by the Council of Europe provide the basis for the elaboration of a theoretical framework that includes the imagination of democratic and sustainable futures as one of its main conceptual axes. This study analyses official documents of public policies carried out in the Iberian context, to examine the treatment of the idea of future in education systems. Three levels of policies have been studied: state educational laws, primary education curricula and institutional teacher training policies. The public policies have been analysed using the normative method of content analysis, with a syntactic sampling strategy, calculating the absolute and relative frequency of the units of analysis. Results show that there are few references to the construction of the concept of the future in public policies and suggest that the opportunity to educate others on the imagination of desirable futures may be being wasted.

RESUMEN

En un momento histórico en el que el futuro se concibe como una amenaza, parece altamente relevante educar en la capacidad de imaginar futuros deseables. La Educación para el Futuro (EpF), de tradición anglosajona, representa una referencia de trabajo para responder a las imágenes negativas sobre la idea del provenir. Las competencias de cultura democrática definidas por el Consejo de Europa dan pie a la elaboración de un marco teórico que incluye la imaginación de futuros democráticos y sostenibles como uno de sus principales ejes conceptuales. El presente estudio analiza documentos oficiales de políticas públicas llevadas a cabo en ámbito ibérico, para examinar el tratamiento de la idea de futuro en los sistemas educativos. Se han estudiado políticas públicas a tres niveles: leyes educativas estatales, currículos de Educación Primaria y políticas institucionales de formación docente, para indagar cuál es la presencia del eje conceptual sobre la imaginación de futuros en estos documentos. Las públicas han sido analizadas mediante el método normativo de análisis de contenido, con una estrategia de muestreo sintáctico, calculando la frecuencia absoluta y relativa de unidades de análisis. Los resultados muestran que hay escasas referencias a la construcción del concepto de futuro en las políticas públicas, y dan a entender que se puede estar desaprovechando la oportunidad de educar para la imaginación de futuros deseables.

KEYWORDS | PALABRAS CLAVE

Education for the future, education policies, public policy, citizenship education, democracy, and teacher training.
Educación para el futuro, políticas educativas, política pública, educación ciudadana, democracia, formación del profesorado.

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1. Introduction

On September 23, 2019, activist Greta Thunberg spoke at the United Nations General Assembly and accused the political class, and an entire generation, of having "stolen her future". The will to reclaim it has led to one of the most constant and high-profile student movements of recent years, Fridays for Future, claiming the future through the demand for its reappropriation. This idea of a stolen future, a lost future, is not new. It is the basis of what the philosopher Marina Garcés considers as the fundamental characteristic of the times we live in, the "posthumous" times, in which the future is not conceived as a project, but as a threat (Garcés, 2019; 2020). It is a threat of socio-ecological collapse, forced migrations, unsustainable inequalities, extinction, or the rise of the far-right; a threat empowered by "a media avalanche of catastrophes" (Servigne & Stevens, 2020: 11).

For Garcés (2020: 144), the inhabitants of the 21st century "are those of us who do not imagine any future that is not catastrophic"[1], and who live between fear and resignation to adapt to uncertainty. Leccardi (2014) relates the phenomenon to the timelessness of bibliographies, located in a framework no longer of a "liquid society" (Bauman, 2007), but of an accelerated society in which "the future vanishes: it withdraws into the present, is absorbed by it and is consumed before it can be really conceived" and in which " long-term plans become potentially obsolete, medium- and long-term predictions are impracticable and, finally, the temporal structure of identities is altered" (Leccardi, 2014: 42). What role does education have in the context of this attitude of resignation, or in the face of uncertainty of a future that is no longer promising? Education for the future (EF) emerged precisely to respond to the challenges of educating young people who feel that their future has been stolen from them, who live surrounded by negative images about the future (Santisteban & Anguera, 2013), and whose realities constantly clash with the hopes they project when constructing life projects (Fernández-de-Mosterín & Morán, 2017). EF addresses the future as the basic temporal axis (Santisteban & Anguera, 2014), and is oriented towards the construction of desirable futures. It does not resign itself to giving up but is concerned with the projection of alternative futures from fundamental dimensions such as imagination and committed participation.

In this article, we set out to delve into the relationship between EF and imaginaries, understanding that the first step to building alternative futures is being able to imagine them (Sardar & Sweeney, 2016; Slaughter, 1988). To do so, the principles of EF and the ontological approaches that link it to imagination are reviewed. We wonder to what extent imagination is present in the approaches of democratic culture competences, in which the construction of a more just and liveable future is the main objective. The current student movements, concerned about the climate crisis and the obsolescence of the predominant socio-economic and socio-political models in Western liberal democracies, claim the reappropriation of the future through active participation, from forceful social, political, and economic criticism, and with resilient hope. A few decades ago, in May 1968, the youth proclaimed that imagination had taken power. Surely, the distance between the two movements is only temporary if empowered imagination builds the future and, in order to reappropriate the future, it is necessary to know how to imagine it. In addition, both movements have also explicitly targeted education and its institutions. Given these circumstances, in a world where the outlook for the future lies somewhere between fear, conformity and uneasiness, it seems more than necessary to ask ourselves what the role of formal education is in this conceptual construction. It seems necessary to know what the idea of the future is and how it is constructed within the framework of the current educational system. For this reason, our study uses the state and autonomous legal framework (of Spain and Portugal), the curriculum design of primary education (of the official curriculum of Catalonia and Portugal) and the university design of initial teacher training (of the Autonomous University of Barcelona and the Escola Superior de Educação of the Polytechnic Institute of Lisbon) as a reference, with the aim of identifying the intention of future training and how this is reflected in the official documents, which are a working guide for active teachers.

2. Theoretical framework

2.1. Education for the future

Education for the future (EF) stems from "Future Studies", with an Anglo-Saxon tradition in countries such as England, Australia, New Zealand, and the United States. It attempts to respond to the widespread

existence of negative images about the future and about citizens' perceptions of its uncertainty (Santisteban & Anguera, 2013). It addresses the future as a basic time axis, focusing on the construction of individual and collective futures as a basic educational purpose (Anguera & Santisteban, 2012; Pagès, 2019).

Studies on the future in teaching have been closely related to education for sustainability (Hicks, 2006; Hicks, & Holden, 2007) since on many occasions it is the challenges arising from the climate emergency that have put the future at stake. As Su (2022) explains, "the new educational problem goes far beyond the known tension of an uncertain and open future, which has been a core principle of modern education (…) The problem of uncertainty escalates, since our society cannot ensure that today's children will have a liable planet at all" (p.2). In recent years, the obvious links between EF and the development of historical-time awareness have been identified (Guldi & Armitage, 2016; Burke, 2007), so they have started to develop in the field of "social studies education" and social science education. Santisteban y Anguera (2014: 249) propose an inseparable connection between EF and historical consciousness, insofar as "historical-time consciousness points strongly to the future-present, and education for the future requires reflection on the past and the learning of temporality"

From the perspective of historical consciousness, it is understood that history is not relegated to a past context, but interacts, relates, and is projected in the past-present-future axis (Burke, 2007), in a complex, non-linear way. Slaughter (1988) argues that our present interpretation of the past marks our anticipation of the future. Bell (1997) argues that the past is a guide for living in the present and a tool for building the future. Fontana (2016) mentions that understanding human societies on the time axis allows us to better understand the present, so that with our actions we consciously act to shape the world to come, which is not previously determined but will be the result of what we all know and want to do.

Thus, knowledge of the past would be "a source of insight into the measure of our free will in the future" (Guldi & Armitage, 2016: 66), and its misunderstanding could involve limitations for future participation and action: "Society is plagued by misconceptions about the past, which further limit its collective hopes for the future" (Guldi & Armitage, 2016: 35). Other authors defend the projection of this historical consciousness for the analysis of current social problems, and for the assessment of options and alternatives for the future that are oriented towards social justice (Santisteban, 2017).

The social and sociological emphasis on future projections and their educational dimensions is consolidated through visions that defend a double link between future projections and society: the future as collective constructions and developed within the framework of collectivities, and society as a product of images of a future that is partly shared (Fernández-de-Mosterín & Morán, 2017). In the words of Simmel (1986): "the social fabric, as we know it, is not possible without imagining at least some kind of future". This possibility of imagining is fundamental not only in the projection of futures and alternatives, but also in the possibilities of participation, creation, and social action, and constitutes the main idea on which this study is based.

2.2. Imagination, politics, and future projection

In the context of EF, some of the main models of future projection point to the possibility of imagining as a fundamental element. As an educational problem, the future exists as imaginary, as the projection of what the future may become (Su, 2022). From decolonial educational perspectives, concepts such as imagination, imaginaries and the deconstruction of hegemonic imaginaries are considered indispensable (De-Sousa & Aguiló, 2019; Latouche, 2015; Sant et al., 2018).

Slaughter's (1988) proposal refers to three different dimensions of future projections: possible futures, probable futures and desirable futures. In this case, the first scenario considers the possibility of imagining a future as possible. More recently, Sardar and Sweeney's (2016) proposal posits three other dimensions of future projection that correspond to different levels of complexity: the extension of the present, familiar futures, and unimagined futures. As Almendro (2022) reminds us: "not all imaginable worlds are feasible, fortunately or unfortunately. But there is no doubt that we can only build those worlds that we are capable of imagining". In this case, futures that are an extension of the present would be the easiest to produce and reproduce, followed by familiar ones, known through social and media narratives, real or fictionalized. The maximum complexity lies in the projection of futures that are not part of our imagination. In this sense,

imagination, or the possibility of imagining, is not only a faculty of creative thinking: "there is no imagination that is not political" (Garcés, 2020: 158).

Arendt (2005) and Arendt and Kohn (2006) share this political view of imagination, understanding that it allows us to imagine a different world that influences the judgments and actions of political agents. It advocates that the imagined reality has to maintain relationships and similarities with the present reality, so that transformative action is possible and achievable (Tyner, 2017). It is this connection that generates a connection between the realm of experience (Koselleck, 1993) and the horizon of expectations (Schulz, 2016), and dissociation between the two can lead not only to uncertainty, but also to passivity. Martorell-Campos (2021) puts it simple e: the multiplication of dystopian narratives is not free of ideology, since it plays in favour of a prevailing order that encourages demobilization and defeatism, or the adoption of defensive activism limited to complain. From this perspective, imagination becomes an essential element of politics and of education.

"Imagination is not only a faculty subservient to knowledge. It is the activity that makes the absent present, and therefore, goes beyond aesthetics; it is also an ethical and political virtue. (...) Imagination is not a gift; it is a learned practice. It is the free, but not arbitrary, composition of perspectives on the world" (Garcés, 2020: 158). The idea of imagination as teachable has been developed extensively by Spivak (2012), who argues that the main task of education is to train the imagination to prepare knowledge and reorganise desires. According to Mollenhauer (2008), education has to offer new generations an "exposure to possibility". Not only to signify the present experience, to project and act in the construction of fairer and more liveable futures, but also to be able to react socially to possible unfavourable scenarios. If imagination is teachable, the educational challenge from a democratic perspective is no less: not only can it be taught in favour of the construction of more equal and just futures, but it can also be directed towards more excluding futures. It is interesting, in this case, to retrieve the concept of the self-defence of imagination (Üstündag, 2017): "it is to be able to continue imagining fairer presents and better futures, despite repression. But it is also the need not to forget that the worst can happen" (Garcés, 2020: 159).

In this sense, imagination and its social and educational implications become essential keys to democracy and democratic education. This is due to them being an agent and product of collective projects because images of the future have a great influence on our attitude to participate (Arendt & Kohn, 2006; Santisteban & Anguera, 2013), and because the possibilities of building socially fairer futures in which it is possible to develop personal and collective projects within a framework of a dignified and liveable life depend on them. In the words of Su (2022), it seems fundamental to understand education not only as a preparation to place oneself in a present socio-political sphere and an accommodated future (Su, 2022), but as the space to educate new generations "capable of new beginnings" (Arendt & Kohn, 2006). If imagination is teachable, the educational challenge from a democratic perspective is no less: not only can it be taught in favour of the construction of more equal and just futures, but it could also be directed towards more excluding futures. Thus, the way in which to educate the imagination takes on special relevance and increases the responsibility of the teaching task.

2.3. The "imagine" axis as a representation of the future in the CDC

Education for the future in Spain has received little attention, a situation that contrasts with that of other Anglo-Saxon countries, where education for the future appears in official curricula and in numerous educational proposals. The demand for the incorporation of futures in curricula is not new in countries such as England (Hicks & Slaughter, 1998), where its study has a significant presence in teacher training and in the primary education curriculum, although more space is demanded (Hicks, 2011). Slaughter (2012) assesses that the tools and concepts to work on the future have not been generalized in teaching and, in this sense, concludes that this is still a democratic shortfall. In this context, it seems fundamental for this study to investigate the future projection of educational policies in Spain and Portugal, and to do so in relation to the Competences for Democratic Culture (CDC). The research project in which this study is framed defines four theoretical axes that represent four subdimensions of CDC. These conceptual axes represent a relevant theoretical structuring for the activation and incorporation of CDC in the educational system. The axes in question are the following:

a) "Value. Education for Global Citizenship", which explores forms of education that enable students to deal with local and global challenges in an ethical manner (Lilley et al., 2017).

b) "Examine. Digital Critical Literacy", which highlights the importance of education to be critically literate in the digital context (Pangrazio, 2016) and enables students to critically interpret the media message, including hate speech, and empowers them to produce more democratic and social justice-oriented messages.

c) "Act. Active citizenship and hope for democracy", which proposes to address relevant social problems and controversial issues in educational contexts, with the aim of helping students to engage in a deliberation process (Parker, 2010). In this process, students engage in a discussion that will allow them to make a decision on what actions to take in reference to this issue, with the objective of strengthening the basis of a democratic decision-making culture.

d) "Imagine. Democratic and sustainable futures", which is framed within the principles of education for the future and is the focus of this study. In a framework of incorporating CDC in teaching proposals, it seems relevant to educate young people to imagine desirable democratic futures, as opposed to the dystopian images often presented by primary school students when referring to the future of democracy and humanity (Inayatullah, 2006; Santisteban & Anguera, 2013).

As part of a research project that analyses the presence of CDC and these four conceptual axes in the public policies of different educational systems, the present study looks specifically at the treatment of the axis "Imagine. Democratic and sustainable futures". Considering the importance of education for the future in the first stage of compulsory schooling and accepting the transcendent role that imagination plays in this stage, it is relevant to analyse the presence of this conceptual axis in the documents defining the principles and objectives of this stage, as a tool for understanding where we are and where we should be heading.

3. Methodology

This study analyses public policies in Spain and Portugal concerning teacher training at three levels: state organic laws, which describe the generic legal framework at the state level underpinning the education system; the educational curriculum, whose main function is to guide school activities and provide teachers with a guide for educational actions; and institutional (university) policies, which define the didactic content presented in teacher training provision. The selected public policies had to meet the following criteria:

- Time: Only the latest public policies implemented in January 2021 have been considered.
- Area of Application: Only public policies applied in Spain and Portugal have been considered.
- University teacher training: Only public policies directly or indirectly related to initial teacher education at university level have been considered.
- Age group: Only public policies directly or indirectly related to primary education (aimed at students aged 6-11) have been considered.
- Focus: Only public policies directly or indirectly related to the Competences for Democratic Culture Framework (Council of Europe, 2018) have been considered.

In addition, the public policies analysed are presented at three levels: the first level with state laws, which include organic laws, royal decrees and decree-laws linked to the educational function of primary education and teacher training in Spain and Portugal. The second level includes the educational curricula of Portugal and Catalonia (in the case of Spain, the design of the curriculum is a regional competence). Finally, the third level includes the institutional policies of the Autonomous University of Barcelona (UAB) and the Polytechnic Institute of Lisbon (IPL), in the design of their initial teacher training curricula. Considering these three levels and the aforementioned criteria, the public policies analysed from Spain/Catalonia are as follows:

- Organic Law 2/2006, of May 3, on Education.
- Organic Law 8/2013, of December 9, on Improvements in the Quality of Education (LOMCE).
- Royal Decree 1594/2011, of November 4, which establishes the teaching specialities of the Corps of Teachers who carry out their duties in the stages of Infant Education and Primary Education regulated in Organic Law 2/2006, of May 3, on Education.

- Royal Decree 1393/2007, of October 29, which establishes the organisation of official university education.
- Order ECI/3857/2007, of December 27, which establishes the requirements for the verification of official university degrees that enable the practice of the Primary Education Teacher profession.
- Primary Education Curriculum. Catalonia Government. Department of Education.
- Report of the Primary Education Degree.
- Teaching guides for the subjects that make up the Degree in Primary Education (2021) at the Autonomous University of Barcelona (UAB).

On the other hand, for the analysis of the policies followed in Portugal, the starting point has been the Lei de Bases do Sistema Educativo, of 1986 and revised in 2005. The rest of the documents analysed were as follows:

- Decree-Law no. 79/2014, defining the academic qualifications for teaching activity in basic and secondary education (3-17 years).
- "Perfil dos alunos que concluem a escolaridade obrigatória, Ministério da Educação", Ministry of Education, defining the competences to be developed in students during compulsory education (2017).
- "Referencial Educação para o Desenvolvimento, Ministério da Educação", which defines the involvement of the "Educação na Estratégia Nacional de Educação para o Desenvolvimento", in a global citizenship perspective (Cardoso et al., 2016).
- "Estratégia Nacional de Educação para a Cidadania, Ministério da Educação", curriculum guide for the teaching of the subject "Cidadania e Desenvolvimento", which is compulsory in all grades of basic and secondary education (Direção Geral de Educação, 2017).
- "Aprendizagens Essenciais - Cidadania e Desenvolvimento, Ministério da Educação", which establishes the curriculum for this compulsory subject (Direção Geral de Educação, 2018).
- Training program of the "IPL-Escola Superior de Educação (2020)".
- Statutes of the "Escola Superior de Educação de Lisboa, IPL" (Estatutos da ESELx, 2018).
- Accreditation report of the "Mestrado em Ensino Básico, Português e História e Geografia do IPL-Escola Superior de Educação (2014)".

To carry out this study, public policy documents of different types were analysed, with the aim of observing the presence of "conceptual axes" in the documentation describing these policies. These documents were analysed using the normative method of content analysis (Neuendorf, 2002). Specifically, the data were analysed by different researchers, comparing the results to ensure the reliability of the results. The content of the public policy documents analysed was divided into sentences, using the syntactic sampling strategy (Krippendorff, 2004), where each sentence was considered a single unit of analysis. Finally, the absolute and relative frequency of units of analysis was calculated. This procedure was carried out with the computer support of the qualitative data analysis programme NVivo, which facilitated the coding of the extraction of fragments, as well as the counting of frequencies.

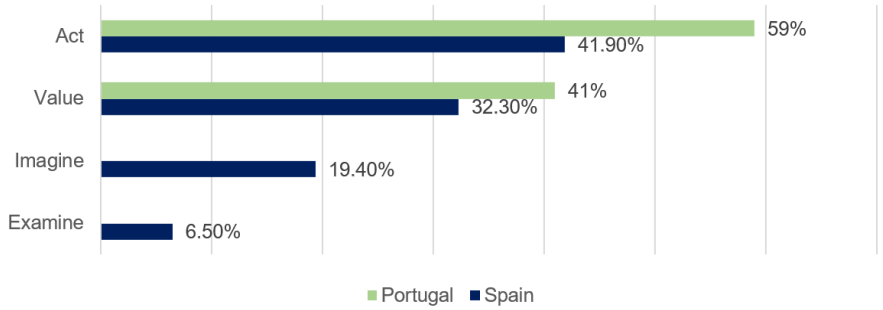
4. Data analysis and results: References to the conceptual axis "Imagine"

After analysing the documents cited, we can show the presence of education for the future as part of the conceptual axis "Imagine", among the four axes defined in the theoretical framework of this article. Specifically, the case of Portugal is marked by a near absence of references to the conceptual axes in national education policy documents and in the guidance documents of the teacher training institution. Out of a total of 125 references, national policy documents account for 13.6% and teacher training documents for 14.4%. In contrast, curriculum guidance documents for basic education (6-12 years) account for 72% of the references.

As far as state policy documents are concerned, in the Portuguese case, the few references are distributed only along the axes "Value" (41%) and, principally, "Act" (59%). The "Imagine" axis, which represents the approach to education for the future, has no presence in these documents, as shown in Figure 1. In the case of Spain, 19.4% of the references to conceptual axes found in-state public policy

documents are included in the "Imagine" axis. Likewise, in this case, the presence of the axes "Act" (41.9%) and "Value" (32.3%) also stand out.

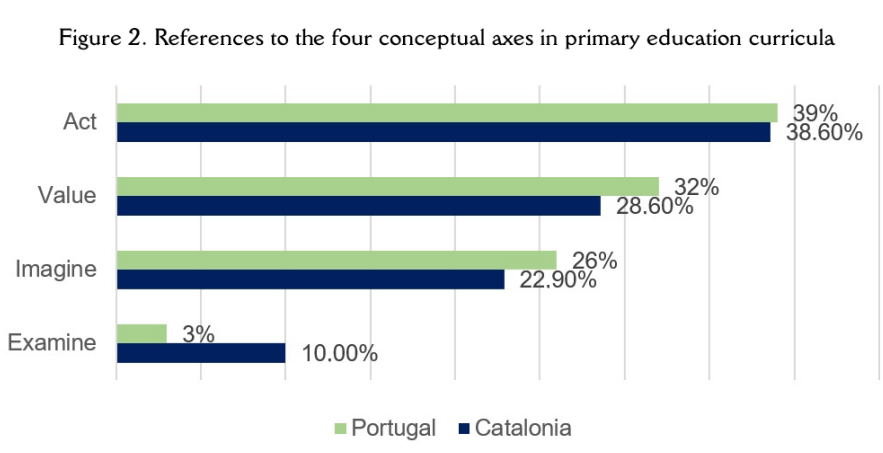
Figure 1. References to the four conceptual axes in state public policies



This lack of reference changes completely when we analyse the curriculum guidance documents for Basic Education (6-12 years) in Portugal. At this level, we found 90 references, which corresponds to 72% of them. In their distribution across the four conceptual axes, "Value" (32%) and "Act" (39%) continue to account for the largest number of references, with a total of 71%, and "Examine" continues to have a residual presence (3%) among the references that have been identified.

In this case, "Imagine" accounts for a significant number of references in the curricular documents of Basic Education in Portugal, reaching 26%. On the other hand, the analysis of the Catalan Primary Education curriculum concludes with a total of 70 references to the conceptual axes, of which 22.9% deal with questions related to the "Imagine" axis, as shown in Figure 2.

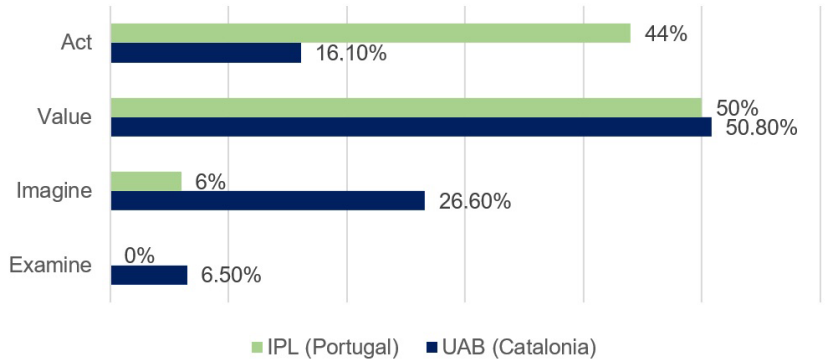
Figure 2. References to the four conceptual axes in primary education curricula



Finally, as far as institutional public policies are concerned, the few references found in the Portuguese case are divided into three conceptual axes: "Value" (50%), "Act" (44%) and "Imagine" (6%). Once again, the axis that focuses on the imagination of the future makes few appearances in the documents analysed, in this case in the training programmes of the Polytechnic Institute of Lisbon (Figure 3).

For their part, the institutional public policies analysed in Catalonia, which include the report of the Primary Education Degree and its teaching guides at the Autonomous University of Barcelona, present a total of 199 references to the four conceptual axes. In this case, the "Imagine" axis has a total of 53 references, representing 26.6% of the total. Again, in this case, the presence of the "Value" axis (50.8%) stands out.

Figure 3. References to the conceptual axes in institutional public policies



5. Discussion and conclusions

From a comparative point of view, the results show that there does not seem to be a single line in the way the construction of the idea of the future is treated in the public policy documents of the respective countries at the Iberian level. While we see similar results in the analyses of Primary Education curricula, state public policies and institutional policies show different results. However, we can identify some common elements. In particular, the two countries agree that the conceptual axis "Imagine" lacks a particularly high percentage of references, especially in contrast to other axes, such as "Value". In practically all cases, the "Imagine" axis occupies the third position in the percentage of frequencies of the selected units of analysis, in some cases with very low percentage figures (the Portuguese case of references to Imagine in institutional public policies, with 6% of them, serves as an example). In fact, in Portugal's state public policies, the axis is not referenced in any of the cases.

The case of the Primary Education curriculum in both Catalonia (26%) and Portugal (22.9%) may be an exception, but these figures do not reach the frequency of the usual priority axes ("Value" and "Act"), nor are they representative of the results of the rest of public policies. On the other hand, in the case of institutional teacher training policies, there are significant differences between the percentage of references to the "Imagine" axis in the documents of the Polytechnic Institute of Lisbon (6%) and the Autonomous University of Barcelona (26.6%), but the figures are still not remarkable in either case, compared to other axes, such as "Value". Thus, despite the disparity in the results between them, the two countries have in common that the treatment of the idea of the future, although it has a certain presence in the plans of the respective education systems, does not seem to be a priority in the design of public policies for the time being.

In the theoretical framework of this article, we pointed out that imagination, and with it the imagination of a desirable future, is teachable. This study's introduction states that the tendency of people in the 21st century is to imagine, with resignation, a catastrophic future (Hicks, 2006; Garcés, 2020), without the capacity to make medium- and long-term predictions (Leccardi, 2014). In this context, and understanding imagination as a teachable skill (Garcés, 2020), the responsibility of educating to learn to imagine desirable futures falls on the proposals of Education for the Future. Thus, without public policies that prioritise the treatment of EF in their curricula, the tendency to imagine the future in catastrophic terms will continue, without bringing about any change that would improve the trajectory towards another type of conceptual construction. In turn, the implementation of Education for the Future can also represent an application of the Competences for Democratic Culture, specifically in the case of "Imagine. Democratic and sustainable futures". In short, the present study is a wake-up call. The results of this analysis suggest that the opportunity to educate learners to imagine desirable futures may currently be missed in the participating countries. This not only condemns us to remain forever in the "prisons of the possible" (Garcés, 2020) but considering that EF is developed by establishing a connection with the past (Santisteban & Anguera, 2014), it also limits our ability to help students build historical awareness.

Notes

[1]All references by this author are translations of the original texts written in Catalan.

Authors' Contribution

Idea, M.C, M.M.S, N.G.M.; Literature review (state of the art), M.M.S, M.C, N.G.M; Methodology, M.C, A.G.D; Data analysis, M.C, A.G.D, M.J.H; Results, M.C, A.G.D, M.J.H.; Discussion and conclusions, M.C.; Writing (original draft), M.C, M.M.S; Final revisions, M.C, M.M.S, A.G.D.; Project design and Funding, M.C.

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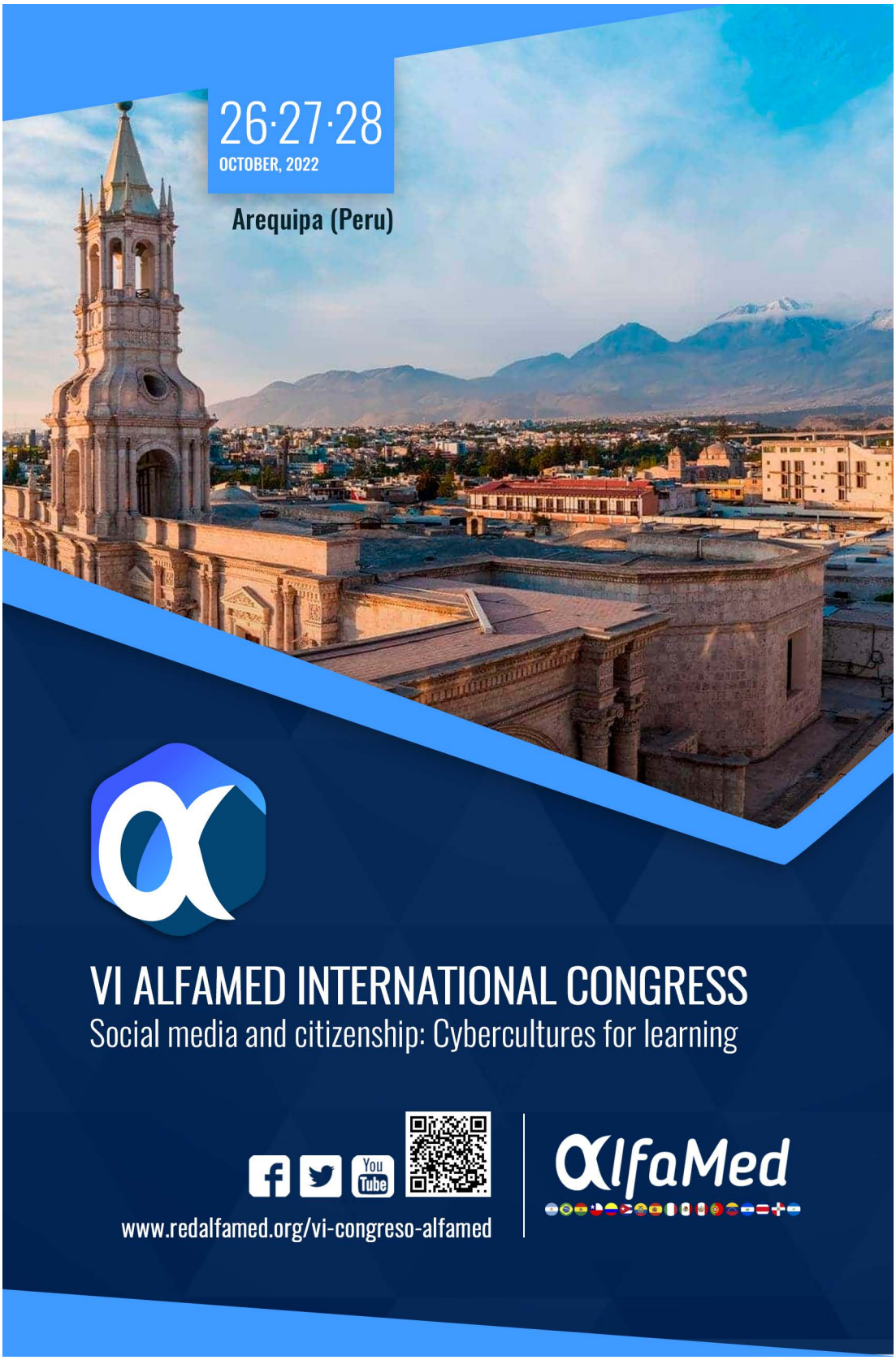

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The COVID-19 infodemic among young people and adults: The support of critical media literacy

La infodemia del COVID-19 en jóvenes y adultos: El soporte de la alfabetización crítica mediática

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ABSTRACT

The COVID-19 pandemic has flooded the public sphere with large amounts of information, engendering what some specialists have dubbed the infodemic. Among the mechanisms used to mitigate the effects of the infodemic, critical media literacy has proven a valuable approach. This study aimed to analyze the critical media skills (CMS) of young people and adults in relation to the variables of infodemic awareness (IPA), infodemic and wellbeing (ISW), emotional reaction (ERI), and media trust (MTC). A cross-sectional online study with 404 participants (Mage=32.8) was conducted in two virtual communities in Mexico during the first semester of 2021. Descriptive analysis revealed highly critical media skills in participants. Adults showed high levels of IPA, while young people presented high levels of ISW, ERI, and MTC. Observations by the age group indicated an association between CMS and ISW, and CMS and MCT, while the association between CMS and IPA was null. The COVID-19 outbreak has intensified the consumption of digital media and access to untrustworthy information. Critical media literacy may protect individuals from the risks of infodemic by enhancing critical roles and attitudes toward media discourse. This study supports the recommendation to promote media literacy initiatives that inoculate critical media skills as mechanisms to counteract the misinformation in health crises.

RESUMEN

La pandemia por la COVID-19 ha inundado de información poco confiable la esfera pública dando lugar a lo que algunos especialistas llaman la infodemia. Entre los mecanismos utilizados para mitigar los efectos de la infodemia, la alfabetización mediática ha demostrado tener un papel valioso. Este estudio tuvo como objetivo analizar las actitudes críticas hacia los medios (ACM) de jóvenes y adultos en relación con la percepción de infodemia (PAI), su influencia en el bienestar socioemocional (BSE), las reacciones emocionales (REI) y la confianza en los medios (CMC). Realizamos un estudio transversal con 404 participantes (M=32,8) en dos comunidades virtuales de México durante el primer semestre de 2021. El análisis descriptivo mostró niveles altos de ACM entre los participantes, mayores niveles de PAI en adultos y mayores niveles de BSE y REI en jóvenes. Las observaciones por grupo de edad revelaron una asociación entre ACM y las variables BSE y CMC, mientras que la asociación entre ACM y PAI fue nula. La pandemia de la COVID-19 ha intensificado el consumo de medios e información no confiable. La alfabetización crítica mediática puede proteger a las personas de los riesgos de la infodemia al mejorar sus competencias y habilidades para informarse. Los resultados de esta investigación respaldan la recomendación de promover iniciativas de alfabetización mediática que favorezcan las actitudes críticas como mecanismos de defensa en crisis sanitarias.

KEYWORDS | PALABRAS CLAVE

Media literacy, critical media skills, infodemic, media wellbeing, media trust, COVID-19.
Educación mediática, competencias críticas, infodemia, salud mediática, confianza, COVID-19.

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1. Introduction

Amidst the COVID-19 pandemic, both digital and traditional media have served as a major source of information to palliate the effects of uncertainty. Paradoxically, they have also acted as a wellspring of misinformation, fake news, and conspiracy theories (Masip et al., 2020; Rocha et al., 2021). It was at the beginning of the COVID-19 outbreak when health authorities stated that the fight against COVID-19 was accompanied by a fight against the infodemic (World Health Organization, 2020), a complex phenomenon that involves the production and consumption of information regarding a topic of public interest.

The infodemic comprises the making and dissemination of large amounts of information, including deceitful content that spreads confusion and anxiety (Patel et al., 2020). Different studies suggest that the COVID-19 infodemic has been a key factor to disrupt the public opinion and affect the social environment (Lin, 2020; Patel et al., 2020). Moreover, the COVID-19 infodemic has affected the trust in, and the legitimacy of public media and the government in different countries (Xu, 2021; Zhao et al., 2020); in addition to cause people's emotional reactions such as fear, stress, and loneliness (de-Bruin et al., 2020; Green et al., 2020).

Both governments and health authorities have implemented several mechanisms to diminish the effects of the infodemic (Lovari, 2020). Media literacy has proven to be an efficient resource to encourage people to apply more critical criteria to evaluate media information sources (Melki et al., 2021; Rajasekhar et al., 2021). Training in media literacy is therefore, considered a lifelong learning process that involves learning from both formal education and vivid experiences that activate self-protection mechanisms against deceitful media (Kendall & McDougall, 2012), and empower media users to deal with the infodemic.

The current COVID-19 pandemic has introduced an opportunity to acquire new media literacy competencies as well as to train individuals' inoculated skills (Basol et al., 2021; Rajasekhar et al., 2021). The need to assess the media competencies during the COVID-19 pandemic has led us to explore the role of critical media skills to deal with the infodemic. Considering the diversity of media consumption habits and preferences during the pandemic (Liu et al., 2021; Masip et al., 2020; Nguyen et al., 2021), we analyzed the critical media skills of young people and adults.

1.1. Critical media skills and mitigation of the infodemic

Academic literature offers numerous definitions of media literacy. According to authors such as Potter (2013), media literacy can relate to many different things in diverse fields. While some authors refer to media literacy as the ability to access and manage the media, others focus on people's ability to understand, analyze and evaluate the texts, images, and sounds that comprise contemporary audiovisual culture. In accordance with these ideas, Ferrés and Piscitelli (2012) propose media literacy as a generic framework of competencies that covers multiple dimensions such as people's attitudes, perceptions, and abilities in relation to the production, distribution, and reception of media information.

Scientific research has traditionally covered medium-centered literacies, but growing interest in the role of audiences has led to emerging fields of specialization. Critical media literacy has been underlined as a novel field for understanding difficult-to-observe practices such as people's management of information within a complex media structure (Kendall & McDougall, 2012). As a field of study, critical media literacy explores people's understanding of media messages and conventions, their ability to analyze stereotyped discourse and dominant values, and their attitudes and perceptions of media messages (Kellner & Share, 2007). Critical media literacy training can take place in both formal and less formal learning environments. It can be inherent to both the process and the outcome of situated learning practices where media users have to deal with media content, make decisions, and make sense of the information they consume or are exposed to (Kendall & McDougall, 2012; Sánchez-Reina, 2020).

In the context of the COVID-19 outbreak, scientific literature has identified critical media skills such as the ability to assess, synthesize, and analyze media content as weapons to defeat the infodemic. Indeed, according to scientific reports, critical media skills such as the evaluation, selection, and fact-checking of media information are likely to decrease the impact of the infodemic. Media literacy training projects conducted by Pérez-Escolar et al. (2021) and Scheibenzuber et al. (2021) during the

COVID-19 pandemic revealed that training in fact-checking skills may improve people's abilities to tackle disinformation. Additionally, Espina and Spracklin (2021) evidenced that these literacy skills can support health professionals by increasing their confidence when evaluating online information and specialized health journals.

Furthermore, research has highlighted correlations between critical media competencies and institutional (dis)trust. In their descriptive study, Austin et al. (2021) found a strong relationship between media literacy and the acceptance of official information disseminated by the government. In contrast, Pickles et al. (2020) observed that Australian citizens showed lower institutional trust and greater rejection of official governmental information mostly supported by misinformation (fake news, rumors, and myths). Additional studies have focused on the prebunking: the inoculation of knowledge and experiences to deal not only with disinformation, but also with associated situations t (e.g., deception, manipulation, and polarization). Basol et al. (2021) evaluated the efficacy of two pre-bunking interventions and determined that media literacy training can increase critical attitudes, including the ability to perceive manipulative information about COVID-19, the confidence to spot misinformation, and the willingness to share fake news with others. Similarly, Guldin et al. (2021) compared the performance of individuals to deal with misinformation by observing new and existing critical skills, concluding that people with previous training were better protected against the infodemic. Forsythe (2020) offers a different perspective, observing that although the infodemic can be diminished by enhancing critical media attitudes, training in information skills might not tackle the overall problem of many people's lack of health literacy, such as little knowledge of what a virus is, how contagion and immunization work, and so forth. To this argument, authors such as Brodsky et al. (2021) posit the idea of curricula, raising that to improve critical media skills, it is first necessary to equip the individual with a curriculum programmed for specific scenarios.

In the context of an unprecedented event in modern history such as the COVID-19 outbreak, media literacy has emerged as a resource for dealing with the infodemic. Fake news, conspiracy theories, and other myths around the COVID-19 pandemic have variously influenced populations in correlation with the lack of media education and health literacies (Forsythe, 2020; Patel et al., 2020). Both inoculated skills and the current implementation of media literacy programs have succeeded as important tools to fight the negative impacts of the COVID-19 infodemic. While current literature has focused on assessing the outcomes of interventions, few studies have explored the role of inoculated critical media literacies and their relation to other subsidiary variables. In this respect, this study observed the following concepts:

Infodemic perception and awareness (IPA): Described as the ability to evaluate the state of information, IPA encompasses the ability to monitor one's media consumption and execute copying skills against unreliable and deceitful information. In line with the studies conducted by Espina and Spracklin (2021), Pérez-Escolar et al. (2021), Scheibenzuber et al. (2021), and Vraga et al. (2020), higher critical media attitudes correspond to higher infodemic awareness. It was thus hypothesized that high levels of infodemic awareness would be associated with high levels of critical media literacy (H1). Infodemic and socio-emotional wellbeing (ISW): This refers to both the physiological and socio-emotional mechanisms that the exposure of information produces in individuals, as well as the strategies they develop to protect themselves from them. As discussed by recent studies, higher critical media skills may be associated with lower levels of stress, fear, and anxiety (de-Bruin et al., 2020; Ouedraogo, 2020). Moreover, critical media skills may decrease the emotional reactions to infodemic (ERI) (Borah et al., 2021; Scribano & Lisdero, 2020). In this line, we hypothesized that the higher levels of critical media literacy would be associated with lower levels of socio-emotional effects and emotional reactions (H2).

Media trust and confidence (MTC): This refers to the confidence people grant in media sources. It comprises people's acceptance and reliability of information elaborated or coming from it. According to prior research (Austin et al., 2021; Okan et al., 2020; Pérez-Escoda et al., 2021; Pickles et al., 2020), a higher level of critical media attitudes correlates with higher trust in information from primary sources (e.g., institutional media, government media) and less reliability in non-formal media (e.g., social media, and primary circles of socialization). We, therefore, hypothesized that higher levels of critical media literacy might be associated with higher institutional media trust and confidence (H3).

2. Method

2.1. Sample and procedure

A cross-sectional descriptive study was designed using an online questionnaire to measure media consumption habits, perceptions, and attitudes towards information during the COVID-19 outbreak. As in similar studies conducted in virtual environments (Baltar & Brunet, 2012; Rife et al., 2016), convenience sampling was used. Two project researchers shared the online questionnaire with non-official social media groups of two university virtual communities, namely FCCom BUAP (N=4,100), and Facultad de Psicología, BUAP (N=3,400). To gain wider heterogeneity in the sample, the snowball technique was applied by asking participants to share the questionnaire among potential participants. Additionally, the questionnaire was shared via researchers' social media profiles on LinkedIn and Twitter.

Data collection took place from March to June 2021 from a total of 414 individuals. After data verification and cleaning, the final sample was set at 404 participants. Demographically, 41.1% (n=166) of participants were men, 57.9% (n=234) were women, and 2% (n=4) preferred not to specify. The mean age of participants was 32.8 years (SD=12.65). The highest educational attainment was university studies (79.2%, n=320), and 65.6% of respondents (n=265) declared themselves to be employed.

The expressly designed questionnaire was adapted to Google Forms and consisted of five sections with a total of 55 items. Collected data included a) demographic information, b) a self-report of media consumption habits, c) a self-report of news consumption, d) assessment of perceptions and attitudes towards media information, and e) assessment of the socioemotional effects of the infodemic. All participants were informed of the project's purpose, and the questionnaire included an information sheet on the nature of the project and the participants' right to withdraw at any time. In compliance with the ethical protocol of Pompeu Fabra University and the GDPR 2018 regulation, the questionnaire was fully anonymous and only non-sensitive information was collected.

2.2. Measurement

The study encompassed how the following variables were impacted by critical media skills (CMS): infodemic perception and awareness (IPA), infodemic and socio-emotional wellbeing (ISW), emotional reactions to infodemic (ERI), and media trust and confidence (MTC). Following recent literature on media literacy and the COVID-19 infodemic, a list of variables and indicators was compiled and translated into a questionnaire. A first version of the questionnaire was revised by two senior researchers in media communication and sociology, and piloted with a group of university students. Adjustments were made to improve interaction and readability. An overall description of the analyzed variables is provided below. Table 1 summarizes the frequencies for the measured items in the employed scales.

Critical media skills (CMS). We constructed a 6-item scale to assess CMS toward media information based on the indicators of media literacy competencies proposed by Ferrés and Piscitelli (2012). The CMS scale was reported on a 5-point scale rating agreement from (1) strongly disagree to (5) strongly agree. The section yielded scores of $M=21.8$ and $SD=5.0$ and a reliability coefficient of $\alpha=.86$.Infodemic perception and awareness (IPA). This variable measured perceptions and attitudes towards the infodemic using a 6-item scale reported on 5-rating points (1=strongly disagree, 5=strongly agree). The section results had a mean of 18.67, SD=3.72, and $\alpha=0.61$. Infodemic and socio-emotional wellbeing (ISW). This variable assessed the self-perceived effects of the infodemic on physical health, stress, and emotions. The variable was measured with three items reported on a 5-point Likert scale (1=strongly disagree, 5=strongly agree). The scale reported an average score of $M=9.02$, $SD=3.36$, and $\alpha=0.83$. Additionally, respondents were asked to grade their emotional reactions to news information (ERI). As per prior research (Scribano & Lisdero, 2020), ERI was rated on a 4-point scale (1=not at all, 4=very much). The scale yielded values of $M=21.60$, $SD=4.94$, and $\alpha=0.79$.

Media Trust and Confidence (MTC). In line with prior research (Losada-Díaz et al., 2020; Zhao et al., 2020), confidence in the news and COVID-19 information disseminated by mass media, the government, social media, and the primary social sphere (family and friends) was measured. MTC was reported on a 5-point scale (1=not at all to 5=very much). This section yielded scores of $M=11.46$, $SD=2.56$, and $\alpha=0.64$. As part of the descriptive analysis, media consumption habits (MCH) were also measured. This

variable included self-reporting of news consumption during the pandemic in terms of the frequency of consumption and media preferences. While frequency was measured using a 5-point scale for news consumption ("How often have you consumed news concerning the COVID-19 outbreak?"; 0=never to 5=always), media preference was measured via a multiple-choice question to identify the most and least consumed media sources. Responses were classified into two categories, namely digital media and traditional media consumption.

Table 1. Descriptive statistics for measured variables

		Disagree N (%)	Somewhat N (%)	Agree N (%)	Mean
CMS	I am used to in-depth reading	56 (13.9)	135 (33.4)	213 (52.7)	3.52
	I reflect on the veracity of what I read/see/listen to	31 (7.7)	107 (26.5)	266 (65.8)	3.81
	I contrast the information I read/see/listen to with third-party sources	57 (14.1)	103 (25.5)	244 (60.4)	3.64
	I verify news features such as the date, media source, or journalist's name	87 (21.5)	87 (21.5)	230 (56.9)	3.50
	I do fact-checking before sharing news on social media	52 (12.9)	81 (20.0)	271 (67.1)	3.83
	I can identify fake news	68 (16.8)	126 (31.2)	210 (52.0)	3.51
IPA	My information consumption has increased during the COVID-19 outbreak	105 (26.0)	128 (31.7)	171 (42.3)	3.22
	Having a lot of information makes me feel safe	165 (40.8)	157 (38.9)	82 (20.3)	2.71
	I find myself well-informed	67 (16.6)	150 (37.1)	187 (46.3)	3.34
	There is an excess of information concerning the COVID-19 outbreak	75 (18.6)	65 (16.1)	264 (65.3)	3.79
	The excess of information prevents me from understanding what is happening	140 (34.7)	127 (31.4)	137 (33.9)	3.01
	I prefer to avoid information so as not to alter my emotional state	195 (48.3)	111 (27.5)	98 (24.3)	2.61
ISW	The excess of information has affected my well-being	190 (47.0)	115 (28.5)	99 (24.5)	2.69
	The COVID-19 outbreak has affected my emotional state	94 (23.3)	109 (27.0)	201 (49.8)	3.38
	I have experienced stress after being exposed to COVID-19 news/information	165 (40.8)	87 (21.5)	152 (37,6)	2.95
		Not at all	**Some**	**Very much**	**Mean**
ERI	Awe: Fear / Sadness	63 (15.6)	230 (56.9)	111 (27.5)	2,69
	Contempt: Anger / Disgust	44 (10.9)	216 (53.4)	144 (35.6)	2,92
	Optimism: Joy / Surprise	93 (23.1)	283 (70.1)	28 (6.9)	2,23
	Worriedness: Anxiety / Uncertainty	50 (12.4)	181 (44.7)	173 (42.8)	2,94
		Not much	**Rather**	**A lot**	**Mean**
MTC	Trust in news and information disseminated by the government	119 (29.5)	119 (29.5)	166 (41.1)	3.09
	Trust in news and information disseminated by the mass media	105 (26.0)	179 (44.3)	120 (29.7)	3.00
	Trust in news and information disseminated on social media	116 (28.7)	184 (45.5)	104 (25.7)	2.93
	Trust in news and COVID-19 information disseminated by family and friends	222 (55.0)	130 (32.2)	52 (12.9)	2.44

Note. Percentages represent recorded rating scale values.

2.3. Data analysis

The age variable was divided into two age groups constructed according to the criteria of the Panamerican Health Organization (2009): youth included participants from 18 to $\leq$ 26 years (n=187, 46.3%), while adults included participants from 27 to 65+ years (n=217, 53.7%). The first level of analysis included descriptive statistics analysis and normality tests for both age groups. A chi-square test observed the differences in CMS, IPA, ISW, ERI, and MTC scale items. The second level of analysis included hypothesis testing. As a first step, the average score of the scales was computed considering the transformation of the Likert items that required inversion (Suárez-Álvarez et al., 2018) and a Pearson test was performed to observe zero-order correlations. The second level of analysis included an ANOVA test for age groups according to their CMS levels (i.e., youth with lower CMS, youth with higher CMS, adults with lower CMS, and adults with higher CMS). CMS levels were computed as a binary variable according to the distribution of percentiles of CMS-scored values. Lower CMS was defined as a score $\leq$ the 50^{th} percentile (6–22 points), while higher CMS was defined as a score $\geq$ the 50^{th} percentile (23–30 points).

3. Analysis and findings

3.1. Descriptive analysis

Adults reported higher values for the frequency of news consumption (M=3.24, SD=.94) in comparison to youth (M=3.00, SD=.86, t(402)=-2,52, p=<0.05). Regarding media preferences, both

groups were more likely to use digital media to be informed. Preference for digital media was greater among adults (M=1.66, SD=.88 vs M=1.22, SD=.80, t(402)=5.30, p=<0.05). Media consumption preferences varied between age groups: digital press, websites, and social media were preferred by youth over traditional media (press, radio, and television). Concerning media formats, audiovisual content such as podcasts, videos, and infographics were mostly preferred among young people. Table 2 summarizes the reported media consumption habits and preferences for media formats.

Table 2. Media consumption habits in youth and adults

	X2 (df)	Youth (N %)	Adults (N %)
Paper Press	1.87(1)	9.6 (18)	6% (13)
Radio †	5.21 (1)	20.9 (39)	30.9 (67)
Television	0.30 (1)	46.5 (87)	43.8 (95)
Average Score for Traditional Media		**M=0.77 (SD=.77)**	**M=0.81 (SD=.76)**
Digital Press	2.47 (1)	67.9 (127)	60.4 (131)
Websites†	14.38 (1)	31.0 (58)	15.2 (33)
Social Media†	18.65 (1)	67.9 (127)	46.5 (101)
Average Score for Digital Media		**M=1.66 (SD=.88)**	**M=1.22 (SD=.80)**
Preferred media formats			
Newspaper Articles	0.00 (1)	44.9 (84)	44.7 (97)
Audiovisual Clips	2.32 (1)	43.9 (82)	36.4 (79)
Alternative Media Sites	3.43 (1)	34.8 (65)	26.3 (57)
Podcasts †	7.74 (1)	23.5 (44)	12.9 (28)
Infographics †	9.95 (1)	35.8 (67)	21.7 (47)
News (Digital Press) †	12.16 (1)	75.4 (141)	59.0 (128)
News Special Reports	0.00 (1)	50.3 (94)	50.7 (110)
Videos †	4.26 (1)	34.8 (65)	25.3 (55)

† Statistically significant differences for age groups reported with a chi-squared test p<.05.

As shown in Table 3, both youth and adults reflected high mean values for CMS scale, and no statistically significant differences were reported in the scale items.

Table 3. Mean values for observed variables in young people and adults

		X2 (df)	YOUTH (M, SD)	ADULTS (M, SD)
CMS	I am used to doing in-depth reading	5.23 (4)	3.55 (1.07)	3.50 (0.94)
	I reflect on the veracity of what I read/see/listen to	3.50 (4)	3.79 (0.95)	3.84 (1.04)
	I contrast the information I read/see/listen to with third-party sources	6.17 (4)	3.55 (1.04)	3.71 (1.03)
	I verify news features such as the date, media source, or journalist's name	2.32 (4)	3.43 (1.27)	3.56 (1.17)
	I do fact-checking before sharing news on social media	2.06 (4)	3.86 (1.14)	3.80 (1.13)
	I can identify fake news	7.52 (4)	3.61 (1.11)	3.42 (1.09)
	Mean Score for Averaged Scale		**3.63 (0.84)**	**3.63 (0.83)**
IPA	My information consumption has increased during the COVID-19 outbreak† **	15.09 (4)	3.41 (1.04)	3.05 (1.22)
	Having a lot of information makes me feel safe	8.81 (4)	2.82 (1.01)	2.60 (1.09)
	I find myself well-informed† *	12.12 (4)	3.46 (0.88)	3.23 (1.06)
	There is an excess of information concerning the COVID-19 outbreak†*	10.38 (4)	3.96 (1.14)	3.65 (1.36)
	The excess of information prevents me from understanding what is happening	2.73 (4)	2.97 (1.17)	3.04 (1.18)
	I prefer to avoid information so as not to alter my emotional state	8.52 (4)	2.44 (1.24)	2.76 (1.26)
	Mean Score for Averaged Scale		**3.09 (0.46)**	**3.17 (0.54)**
ISW	The excess of information has affected my well-being	1.81 (4)	2.75 (1.29)	2.64 (1.21)
	The COVID-19 outbreak has affected my emotional state	5.00 (4)	3.50 (1.29)	3.28 (1.25)
	I have experienced stress after being exposed to COVID-19 news/information	7.24 (4)	2.89 (1.45)	3.00 (1.31)
	Mean Score for Averaged Scale		**3.04 (1.18)**	**2.97 (1.06)**
ERI	Awe: Fear / Sadness	5.10 (2)	2.66 (0.86)	2.70 (0.79)
	Contempt: Anger / Disgust	6.00 (3)	2.94 (0.83)	2.91 (0.94)
	Optimism: Joy / Surprise† **	12.33 (2)	2.30 (0.70)	2.17 (0.66)
	Worriedness: Anxiety / Uncertainty	.042 (3)	2.97 (0.93)	2.93 (0.93)
	Mean Score for Averaged Scale		**2.71 (0.60)**	**2.68 (0.62)**
MTC	Trust in news and information disseminated by the government† **	21.76 (4)	3.33 (0.97)	2.88 (1.15)
	Trust in news and information disseminated by the mass media† *	15.58 (4)	3.14 (0.77)	2,88 (0,96)
	Trust in news and information disseminated on social media† **	14.36 (4)	3.03 (0.79)	2,85 (0,88)
	Trust in news and other COVID-19 information disseminated by family and friends	6.16 (4)	2.37 (0.98)	2,51 (0,93)
	Mean Score for Averaged Scale		**2.96 (0.60)**	**2,77 (0,66)**

Note. *p<.05, **p<.01 †Statistically significant differences as reported in chi-square test.

With regards to IPA, young people showed higher mean values for the perception of larger media consumption in comparison to adults (M=3.41 vs M=3.05), and higher mean values for infodemic awareness (M=3.96 vs M=3.65). Adults, on their part, reported larger mean values for feeling confused due to the excess of information (M=3.04 vs M=2.97) and avoiding information to prevent emotional stress (M=2.76 vs M=2.44). Significant statistical differences were found only in three scale items. Similarly, the ISW variable had larger mean values among youth for items such as the effects of the

infodemic on well-being and emotional state. Adults reported higher values for feeling stress after being exposed to COVID-19 information (M=3.00 vs M=2.39). No statistically significant differences were reported in the scale items. Aligned with this, ERI was higher among young people in comparison to adults, with anxiety and uncertainty being revealed as the most frequently manifested emotions. Positive emotional reactions such as joy and surprise reported statistically significant differences as youth reported higher mean values (M=2.30 vs M=2.17). Lastly, the MTC analysis yielded larger mean values among youth for information sources such as the government, mass media, and social media. Significant statistical differences were found in these items. Adults reported higher trust in information from family and friends.

3.2. Critical media skills in young people and adults

Table 4 displays the descriptive statistics of the scales and zero-order correlations. On average, CMS, IPA, and ISW had large mean values, while ERI and MTC yielded moderate numbers. Correlational analysis revealed a significant association between CMS, IPA, ISW, ERI, and MTC. However, correlations were weak. IPA was also positively associated with ISW and ERI and negatively correlated with MTC. ERI was moderately correlated with ISW, whereas the MTC was generally negatively correlated with IPA.

Table 4. Descriptive statistics and zero-order correlations (general sample)

	Descriptive Statistics				Zero-Order Correlations				
	Min.	Max	M	SD	1	2	3	4	5
1. Critical Media Skills (CMS)	1.00	5.00	3.63	0.84	-				
2. Infodemic Perception and Awareness (IPA)	1.83	4.67	3.14	0.51	0.110*	-			
3. Infodemic and Socio-emotional wellbeing (ISW)	1.00	5.00	3.00	1.12	0.230**	0.302**	-		
4. Emotional Reactions to Information (ERI)	1.00	3.88	2.70	0.61	0.218**	0.145**	0.623**	-	
5. Media Trust and Confidence (MTC)	1.00	4.50	2.86	0.63	0.203**	-0.113*	0.100*	0.109*	-

Note. *p<.05, **p<.01.

Group observations according to CMS level (Table 5) indicate the lowest IPA value for youth with L-CMS (M=3.05) and the highest for adults with H-CMS (M=3.19). However, no significant statistical differences were reported. Youth and adults with H-CMS had higher mean values for ISW (M=3.19 and M=3.20, correspondingly), and significant statistical differences were observed (p<.001). Consistent with this, youth and adults with H-CMS also reported higher values for ERI. Lastly, youth and adults with H-CMS had larger values for MTC, and statistically significant differences confirmed the mean differences within groups (p<.001).

Table 5. Mean comparisons for CMS levels in youth and adults

		N	*M*	*SD*	gl	F	P
IAP	Youth L-CMS	95	3.05	0.48	3	1.29	p>.05
	Youth H-CMS	92	3.15	0.45			
	Adults L-CMS	113	3.15	0.52			
	Adults H-CMS	104	3.19	0.58			
ISW	Youth L-CMS	95	2.91	1.21	3	3.92	p<.01
	Youth H-CMS	92	3.19	1.15			
	Adults L-CMS	113	2.77	1.11			
	Adults H-CMS	104	3.20	0.95			
ERI	Youth L-CMS	95	2.64	0.59	3	3.80	p<.01
	Youth H-CMS	92	2.80	0.62			
	Adults L-CMS	113	2.58	0.63			
	Adults H-CMS	104	2.81	0.61			
MTC	Youth L-CMS	95	2.94	0.64	3	3.90	p<.01
	Youth H-CMS	92	2.99	0.57			
	Adults L-CMS	113	2.71	0.69			
	Adults H-CMS	104	2.84	0.62			

4. Discussion and conclusions

Media literacy is an arsenal to set back the misleading role of media and counteracts the effects of misinformation. Research has traditionally approached the study of critical media skills as an outcome when most trained abilities are more likely deployed in a situated context such as the COVID-19 infodemic. This study aimed to analyze the critical media skills (CMSs) practiced by Mexican youth and adults to

deal with the infodemic. The findings indicate that CMSs were high in the overall sample. Activities such as fact-checking, media contrasting, and fake news identification were performed by both youth and adults. Conversely, levels of infodemic perception reflected differences, with youth reporting greater awareness of their media/information consumption and a higher belief in being well-informed than adults. Concerning the ISW, the study revealed physical and emotional discomfort among both youth and adults due to exposure to information; in fact, worry stood out as the most prevalent emotion in describing participants' reactions to COVID-19 news. Beyond emotions, people's trust in media information was also affected by the infodemic. In this respect, this study found that youth have higher confidence in the information provided by the media and the government, while adults rely to a greater extent on information from their primary circle (i.e., friends and family).

Hypothesis testing revealed a correlation between CMSs and IPA (H1). However, contrary to prior studies (Mathews et al., 2021; Veeriah et al., 2021), age did not reflect a statistically significant difference. Rating levels for IPA were generally similar, and young people with low CMS reported the lowest mean value. Although authors such as Jamsheed and Bin-Naeem (2020) have emphasized the media literacy divide and the poor critical skills of young people, such differences were not evident in the analyzed sample. A possible explanation could be supported by variables such as the educational levels and socio-economic status of participants. While cited research has observed a larger and heterogeneous sample, findings from this study should be contextualized as adults belonging directly or indirectly to a university community: people with higher media consumption, media literacy skills, and communication practices. Future research should provide evidence, however.

In relation to H2, zero-order correlation indicated an association between CMS and ISW, and CMS and ERI. Observations by age group yielded statistically significant differences. CML decreases the effects of infodemic in both youth and adults. Plus, it is associated with fewer emotional reactions. This finding connects with prior research and validates the idea that better levels of critical media skills may reduce the effects of infodemic (Borah et al., 2021; Ouedraogo, 2020). Nevertheless, newer research, considering a more heterogeneous sample is needed for the extrapolation of these results.

Regarding H3, this study found an association between CMS levels and MTC as both youth and adults with higher CMSs had better values for information reliability. These findings are consistent with prior research (Losada-Díaz et al., 2020; Zhao et al., 2020) as they showed acceptable levels of institutional information. Contrary to Mathews et al. (2021), MTC did not report differences for age groups.

This work analyzed CMSs in the context of the COVID-19 pandemic and therefore, provides a better understanding of how youth and adults have managed the accompanying infodemic. Nonetheless, this research has several important limitations. Results are limited to the context of the study in terms of sample characteristics and the data collection method. Although the study of social media communities may provide an approach to a heterogeneous field of practices, the results may still be difficult to extrapolate beyond this space of socialization, particularly when the majority of participants represent a group with similar practices, which in this case is users who mostly depend on digital media and therefore have advanced literacy skills. Hence, variables such as social class, education level, and prior media education training should be considered as interfering factors. Future research must provide an understanding of these variables and greater heterogeneity in samples. Additionally, similar to studies conducted by Basol et al. (2021) and Brodsky et al. (2021), experimental testing is recommended for the performance of CMSs through the recreation/simulation of real communication scenarios; such testing can better evaluate the performance of critical media literacies in environments facing infodemic linked to public health concerns.

The COVID-19 pandemic has kickstarted media learning and practices, including how to deal with misinformation. Media literacy can operate as a form of protection against an infodemic, but training in media literacy is necessary to equip citizens with these skills. Policy makers, media educators, and health practitioners should understand the current pandemic as an opportunity to prevent future health crises and provide specialists, media educators, and citizens with tools to better understand health literacies and scientific, as well as popular, knowledge. Inoculating CMSs is the most beneficial weapon to counteract future public crises.

Authors' Contribution

Idea, R.S.R., F.G.L.; Literature review (state of the art), R.S.R., F.G.L.; Methodology, R.S.R., F.G.L.; Data analysis, R.S.R., F.G.L.; Results, R.S.R., F.G.L.; Discussion and conclusions, R.S.R; Writing (original draft), R.S.R., F.G.L.; Final revisions, R.S.R; Project design and sponsorship, R.S.R.

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Learning strategies through digital games in a university context

Estrategias de aprendizaje a través de los juegos digitales en un contexto universitario

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ABSTRACT

The relationship between digital games and the mobilization of cognitive and metacognitive learning strategies deserves attention and needs research that contributes to the understanding of how these strategies can favor the teaching and learning processes. This study describes how university students over 18 years of age mobilize cognitive and metacognitive learning strategies through digital games. The research methodology used was ex post facto with a quantitative approach. 941 students from 22 States and from the Federal District, enrolled in higher education courses at Brazilian colleges and universities, participated in this research. Data collection occurred through the application of an online questionnaire that integrates the Metacognitive Awareness Inventory (MAI) and the Inventory of Cognitive and Metacognitive Strategies with Digital Games (ICMSDG). The results indicated that university students make regular use of metacognitive knowledge, skills, and strategies. Moreover, cognitive and metacognitive learning strategies seem to be more mobilized by digital game players than by non-players, particularly among those who played over a longer period of time (9 years or more) and with higher intensity (playing every day). With the results found and analyzed, we observe that this study is relevant for both university professors and game designers who aim to promote metacognition skills.

RESUMEN

La relación entre los juegos digitales y la movilización de estrategias de aprendizaje cognitivas y metacognitivas merece atención y requiere investigaciones que contribuyan a la comprensión de cómo estas estrategias pueden favorecer a los procesos de enseñanza y aprendizaje. Este estudio describe cómo los estudiantes universitarios mayores de 18 años movilizan estrategias de aprendizaje cognitivas y metacognitivas a través de los juegos digitales. La metodología de investigación utilizada fue ex-post-facto con un enfoque cuantitativo. Participaron en esta investigación 941 estudiantes de 22 estados y del Distrito Federal, matriculados en cursos de educación superior en las universidades brasileñas. La recolección de datos fue proporcionada a través de la aplicación de un cuestionario en línea que integra el Inventario de Conciencia Metacognitiva (IMA) y el Inventario de Estrategias Cognitivas y Metacognitivas con Juegos Digitales (ICMSDG). Los resultados indicaron que los estudiantes universitarios encuestados hacen un uso regular de conocimientos, habilidades y estrategias metacognitivas. Además, las estrategias cognitivas y metacognitivas de aprendizaje parecen ser más movilizadas por los jugadores de juegos digitales que por los no jugadores, particularmente entre aquellos que jugaron durante más tiempo (9 años o más) y con mayor intensidad (jugando todos los días). Con los resultados encontrados y analizados, observamos que este estudio es relevante tanto para los profesores universitarios como para los diseñadores de juegos que pretenden promover las habilidades metacognitivas.

KEYWORDS | PALABRAS CLAVE

Digital games, higher education, cognition, metacognition, assessment, questionnaire.
Juegos digitales, educación superior, cognición, metacognición, evaluación, cuestionario.

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1. Introduction

Studies on digital games and their interconnection with education suggest that these artifacts have the potential to promote learning (Prensky, 2007; Castellòn & Jaramillo, 2013; Maharg & de-Freitas, 2011; Pombo & Marques, 2020; Santos et al., 2019). However, there are still gaps in the literature that deserve a closer look and more rigorous research (Van-Eck, 2015). In the digital games research field, there is a limitation in the literature when it comes to research on metacognition, particularly in higher education contexts. This situation implies that it is necessary to invest in this research field. For instance, there is a need to further analyse how people learn with games, when learning happens, or what conditions are necessary for learning with games. In the research studies conducted by Braad (2018), Braad et al. (2019), Hacker (2017), Taub et al. (2020) and Zumbach et al. (2020), metacognitive processes and strategies are presented in their relationship with digital games, either serious games or commercial digital games. These studies indicate that these artifacts can be integrated in the formal education context, with positive or promising results for learning.

From studies on learning strategies that can be implemented or developed with digital games, we sought to clarify the following research problem: how are cognitive and metacognitive learning strategies mobilized through digital games in the context of university students? The aim is to contribute to the literature in the area by analysing how cognitive and metacognitive strategies are mobilized with the use of digital games in the context of university students. The literature specialized on learning processes has sought to know how this phenomenon happens, how it can be enhanced, and what its limits are. In the set of these studies, the concept of metacognition emerges as polysemic. For example, according to Flavell (1979), metacognitive knowledge "is one's stored knowledge or beliefs about oneself and others as cognitive agents, about tasks, about actions or strategies, and about how all these interact to affect the outcomes of any sort of intellectual enterprise" (Flavell, 1979: 906). Several other authors (Hartman, 2001; Matlin, 2004; Fox & Riconscente, 2008; Hertzog & Dunlosky, 2011; Frenkel, 2014) reinforce that metacognition is defined as a person's knowledge, awareness, and control over his or her cognitive processes. Schraw and Dennison (1994), two of the seminar authors on the matter, mention that metacognition refers to one's ability to reflect, understand and control learning, consisting of two main components, knowledge of cognition and regulation of cognition. Firstly, knowledge of cognition includes three subprocesses that facilitate the reflective aspect of metacognition: declarative knowledge (knowledge about oneself and about strategies), procedural knowledge (knowledge about how to carry out the strategies), and conditional knowledge (knowledge about when and why to use the strategies). Secondly, the regulation of cognition refers to the metacognitive activities that help to control thought, and it serves for learning control through a series of sub-processes: planning, information management, comprehension monitoring, debugging, and evaluation.

Boruchovitch (1999) presents a similar understanding to Schraw and Dennison (1994), stating that metacognitive knowledge (or metacognitive awareness) has to do with cognition itself, and concerns: 1) knowledge about oneself (strengths, weaknesses, personal preferences); 2) knowledge about the task (difficulty levels, demands); and 3) knowledge about the use of strategies (which ones, when, why and what for) (Boruchovitch, 1999). According to Boruchovitch, metacognitive monitoring is the evaluation or judgment of the current state of a cognitive activity and/or progress during the performance of a cognitive task (e.g., self-assessment and self-examination). Metacognitive control is understood as the regulation of cognitive activity that is under development; it refers to the actions that can be taken based on the information that resulted from the cognitive monitoring process (Waltz-Schelini et al., 2016).

Analyzing the above presented views on metacognition, we observed that the authors' perspectives complement each other; however, in this study, we adopted the view of Schraw and Dennison (1994). Hence, the data analysis includes the dimensions of knowledge about cognition and regulation of cognition. In a connectivism view, it is understood that several artifacts and technologies can be used to mobilize strategies to support the acquisition, organization, and use of information, aiming at the construction of learning (Pimentel, 2018). Among the technologies, digital games stand out. For Hacker (2017), there are few studies and, hence, there is little empirical evidence that can contribute to the design of serious games that incorporate metacognition, which justifies the study reported in this manuscript.

To understand how digital games can be inserted in the context of metacognitive learning, Castronovo et al. (2018) carried out a quasi-experimental study with 65 engineering students, using a simulation game. In this research with pre-test and post-test, statistical analysis through an ANOVA test was conducted, as data met the assumptions of normality, sphericity, and homogeneity of covariance. Two elements were significant in the results and may help game developers to consider such prompts in their future game design. On the one hand, feedback was an enabler of metacognitive monitoring. On the other hand, play time was also relevant, as it allows the development of discovering which game strategies can correspond to success in a gameplay.

The results obtained with adolescents in this field are also interesting, and prompt us to consider whether or not similar results may be achieved when the participants are higher education students. For example, in the study of Drummond and Sauer (2015), data indicate that metacognitive rates are lower among adolescents who play video games. However, the authors caution that this result does not imply lower academic performance for frequent players. Contrasting research findings were produced by Kim et al. (2009). Their study indicates that a commercial game in conjunction with metacognitive strategies can be an effective way to increase performance in learning or play, stemming from the time they are engaged. For the authors, conversation and observation activities are more effective than writing activities in improving students' achievements. Other studies also favour game's adoption in education. For instance, Ke (2008) sought to analyze whether digital games are effective in promoting math learning. In this study, with 358 students from 18 public schools in Pennsylvania, the researcher carried out a comparative investigation between digital and analog games. The research followed a mixed method model, and the results indicate that computer games, when compared to paper and pencil games, were significantly more effective in promoting learning motivation. However, data showed no significant difference when trying to identify whether digital games facilitated performance in the mathematical cognitive and metacognitive awareness test.

Considering again higher education contexts, Trindade et al. (2019) conducted a study with 91 students, where learning experiences with a digital game were led with an experimental group (N=59). The study results show that games can lead to positive learning outcomes in Physics, in this case regarding electricity, electric charges, and electric field, suggesting that game designers should incorporate metacognitive activities, aiming at promoting activities that generate reflection, which contributes to the consolidation of learning. Moreover, Pouralvar et al. (2019) argue in favour of also considering learning styles in the game design for an effective mobilization of metacognitive strategies. From the above presented analysis, in an understanding of the research on the relationship between cognitive and metacognitive strategies and digital games, this study presents the descriptive statistical analysis of data collected from university students, as will be explained in the following section.

2. Methodology

The conducted study is characterized as a survey (Roni et al., 2020), being an ex post facto research methodology with a quantitative approach (Sampieri et al., 2013; Mattar & Ramos, 2021). Participating in the study, by answering an online questionnaire, were 941 students enrolled in higher education courses from Brazilian colleges and universities. The research field included public and private higher education institutions, receiving responses from 22 states and the Federal District.

2.1. Participants

In this study, due to the difficulty of access to the approximately 8,603 thousand students in higher education courses in Brazil, a non-probability sampling technique was applied to obtain a convenience sample (Neuman, 2014). It is composed of volunteers, contacted by email, who met the desired characteristics: attending a higher education course in a Brazillian institution at the time of the data collection (complying with the research locus), with fluency in Portuguese (the language used in the questionnaires) and signing the Free and Informed Consent Form through virtual means (for conformity with ethical procedures). Hence, participating in this study were adults able to give informed consent. The participants were 941 Brazilian students, enrolled in higher education courses. Most respondents

(67.8%) reported that they lived in the northeast of the country. Students were enrolled between the 1st and 12th period of the course, and 3.2% respondents indicated that they took subjects from different periods. Regarding the age profile, most respondents (42.4%) were aged between 18 and 20 years (Table 1). The sample was composed by convenience and the analysis was made considering two different profiles: game players and non-players.

Table 1. Age by respondents' group (non-players and players)

Age	Non-player		Player		Total	
	frequency	%	frequency	%	frequency	%
18 to 20 years	126	33.60%	273	48.23%	399	42.40%
23 to 27 years	107	28.53%	174	30.74%	281	29.86%
28 to 32 years	38	10.13%	59	10.42%	97	10.31%
33 to 37 years	37	9.87%	21	3.72%	58	6.16%
38 years or more	67	17.87%	39	6.89%	106	11.27%
Total	**375**	**100%**	**566**	**100%**	**941**	**100%**

The study received a Research Ethics Council approval, reference CAAE 4,566,901, and follows all the guidelines indicated by the ethical regulations, including in relation to the Brazilian General Law for the Protection of Personal Data (LGPD, Law No. 13.853/2019).

2.2. Data collection procedures and tools

Data collection was conducted through the application of a self-administered online questionnaire, developed in the form of self-report, in which the respondents themselves must fill in the answers. The questionnaire (Pimentel & Marques, 2021; Pimentel et al., s.n.) consists of three sections: (a) Metacognitive Awareness Inventory (MAI) (Schraw & Dennison, 1994); (b) Inventory of Cognitive and Metacognitive Strategies with Digital Games (ICMSDG) (Pimentel & Marques, 2021); and (c) respondent profile. Section (b) was answered only by those who declared themselves players (N=566).

In the first section, a), the MAI is used. The MAI is an instrument with 52 items built and validated by Schraw and Dennison (1994) to measure the metacognitive awareness of adults. Items are classified into eight subcomponents grouped under two broader categories, knowledge of cognition and regulation of cognition. In this study, the translated version was used and validated in Brazilian Portuguese by Lima Filho and Bruni (2015).

The second section comprises the ICMSDG, which is a 20-item instrument to self-assess the use of cognitive and metacognitive strategies in game play scenarios, presented in Pimentel and Marques (2021). Items are classified into two categories: cognitive and metacognitive learning strategies. An example of a cognitive item is "7. I watch tutorials about games, made by other players" and an example of a metacognitive item is "9. In the game, I think of several ways to resolve a situation and I try to choose the best one."

The ICMSDG development and validation process were described before (Pimentel et al., s.n.). In summary, after a content validation phase, internal validation was performed through a pre-test of the questionnaire and Cronbach's alpha calculation (Cronbach, 1951) with a group of Brazilian university students and players, who composed a convenience sample of 32 respondents. The analysis was performed using the Statistical Package for Social Sciences 24 (SPSS) software and considered the responses of 29 respondents, who indicated that they were digital game players. The responses of 3 subjects were discarded as they were not players. The Cronbach alpha result was 0.84, which is considered an indicator of a highly reliable instrument, according to Cohen et al. (2018). Hence, the ICMSDG has been validated and its reliability tested/confirmed (Roni et al., 2020).

In the MAI and ICMSDG items, a 5-point Likert scale was used, with the following indicators: (1) Strongly disagree; (2) Disagree; (3) Undecided; (4) Agree; and (5) Strongly agree. The third section of the instrument comprises questions that aim to identify the respondents' profile as gamers. Initially, respondents are questioned about what types of digital games they play: Role-Playing Game (RPG), adventure, emulation, simulation, strategy, action, and puzzle. Respondents could also indicate other types. For playing frequency, the following scale was used as a reference: (1) I do not play; (2) Occasionally or (3) Often. In sequence, it was asked which types of digital games the respondent usually plays the most. In addition, it is asked how long he/she plays, on average, with the following options: 1 to 2 hours; 2 to

3 hours; 3 to 4 hours; 4 to 5 hours; more than 5 hours a day. Regarding how many years playing, the options were: 1 to 4 years; 5 to 8 years; and 9 years or more.

The third section of the instrument includes questions to identify the respondents' profile as higher education students. Thus, students are asked to identify the university or college they are enrolled in, as well as the area of knowledge of their course and which period / semester they are attending. For age, the following options are presented: 18 to 22 years; 23 to 27 years; 28 to 32 years; 33 to 37 years and 38 years or more.

2.3. Analysis procedures

The questionnnaire obtained 981 responses, which after data cleaning were reduced to 941 reliable responses. For data cleaning, subjects who were not in graduation, who were not attending Brazilian universities or colleges, who did not agree to participate in the research, who did not complete part 1 of the questionnaire (MAI), and whose questionnaire was completely blank were excluded. Duplicate responses were also excluded. Of the responding students, 376 claimed they do not play digital games (39.79%) and 566 claimed they are players (60.21%).

Regarding the interpretation of results in Likert scales, caution is needed. For example, Pornel and Saldaña (2013) analyzed 53 dissertations and found that the use of a flawed interpretation scheme of the scale items' mean responses was common. For the purpose of interpretation of the mean response, the authors advise the use of the natural boundaries of the integers used as number anchors of the scale as boundaries for categories. According to the authors, the scheme that makes use of the integers' natural boundaries has a good efficiency in estimating the respondent's latent ability that the scale aims to measure. Consequently, considering that this study used a 5-point Likert scale, the interpretation scheme used was: Mean Interval 1.00–1.49=Strongly disagree; Mean Interval 1.50–2.49=Disagree; Mean Interval 2.50–3.49=Undecided; Mean Interval 3.50–4.49=Agree; Mean Interval 4.50–5.00=Strongly agree

Moreover, statistical tests (Shapiro Wilk and Mann Whitney) were performed with the support of the Jamovi software. The normality of the data was verified using the Shapiro Wilk test. The data are presented and analyzed below. For the descriptive data analysis, the information was organized and tabulated. Subsequently, data were analyzed using the following software: Microsoft Office Excel 2019, R 4.0.5 and Jamovi version 1.8.2 for descriptive analysis and statistical tests.

3. Results and discussion

3.1. Metacognitive awareness inventory

Data normality was checked through the Shapiro Wilk test for an alpha level of 0,05. Data descriptives for the MAI section of the questionnaire (N=941) respondents, reveals the values: $W=0.738$ for $p<0.001$, thus, the null hypothesis that the sample comes from a population with a normal distribution is rejected. Hence, non-parametric statistical tests were performed, assigning the confidence interval of 95%.

Mann-Whitney tests were performed for Knowledge of cognition ($U=96614$, $p=0.005$) and for Regulation of cognition ($U=97293$, $p=0.004$). According to Bruce et al. (2018), if the data does not fit the normal distribution, we need to use a non-parametric method, for example, the Mann-Whitney U test as the significance is less than 0.05. By the null hypothesis of the Mann Whitney Test, we assume that the means are not statistically significant. To assess the homogeneity of variance Levene's test was used, and its results are $p=0.470$ for Knowledge of cognition and $p=0.156$ for Regulation of cognition (with $p>0.05$), confirming that the variances of the groups are homogeneous.

The results of the MAI present significant indicators for this study. The Knowledge of cognition and Regulation of cognition categories are identified among the respondents, as the selection of the answers "Agree" (or 4) and "Strongly agree" (or 5) was frequent throughout the sample. Descriptive statistics showed that the median values were the same for the two groups of categories (Knowledge of cognition and Regulation of cognition), and also when the values of these two categories were added together. It is noteworthy that these categories are complementary, forming part of what is called metacognitive awareness. The analysis of these values indicates a great proximity of the responses in these two groups

of metacognitive elements, reinforcing the thinking and conviction in the respondents' use of metacognitive skills and experiences.

The data presented in Table 2 indicate a higher incidence of mobilization of both cognitive and metacognitive strategies by respondents that claim to play games, when compared to those who do not. In other words, this study indicates that Knowledge of cognition and Regulation of cognition are mobilized more effectively by students who use digital games, as there is a relevant selection of "Agree" and "Strongly agree" responses. However, despite the correlation coefficient being very weak ($p<.001$), there is a more frequent mobilization of Knowledge of cognition and Regulation of cognition by those who declare themselves as players.

Table 2. Mobilization of cognitive and metacognitive strategies

	Knowledge of cognition				Regulation of cognition			
	Non-players		Players		Non-players		Players	
	frequency	%	frequency	%	frequency	%	frequency	%
Strongly disagree	0	0	0	0	0	0	0	0
Disagree	6	0.6	4	0.4	0	0.0	0	0.0
Neutral	64	6.8	105	11.2	18	1.9	24	2.6
Agree	217	23.1	372	39.5	181	19.2	328	34.9
Strongly agree	89	9.5	88	9.4	177	18.8	217	23.1

Although the objective of this research is not to make a comparison between players and non-players, the distinction between these two groups of participants is interesting to observe, particularly in that which concerns how metacognitive strategies can be potentiated from the insertion of digital games. This may be used in the context of formal education. As previously seen, the studies of Ke (2008), Kim et al. (2009), Drummon, and Sauer (2015) Castronovo et al. (2018) already indicate that there is a relationship between metacognition and digital games, and the data of the present investigation follow the trend pointed out by these authors. The results obtained in the first part of the instrument indicate that the individuals participating in the study have metacognitive awareness, which may favor their studies, as pointed out in the literature. Based on this result, university professors may carry out a focused planning, taking advantage of the more mobilized strategies, as well as investing on the development of strategies that were not so highlighted, such as those related to procedural knowledge and planning.

3.2. Cognitive and metacognitive strategies with digital games inventory

The second part of the instrument, the ICMSDG, was answered only by students who declared themselves players (N=569). The result was computed and analyzed to relate how cognitive and metacognitive strategies are enhanced from the use of digital games. At this stage, the sums of the responses within the categories were adopted to enable a parametric view of the collected values.

The data can enlighten digital game developers, as well as professors who seek to integrate these artifacts into everyday education. Through analysis it is possible to think of new decisions. For example, activities that promote the development of cognitive strategies need to be provided as the result was neutral in 48% of the responses. For the metacognitive strategies, the score for "Agree" and "Strongly Agree" was 95%, adding the two answer options together. For the cognitive strategies, the result was 39%. In other groups of students, it is possible that this index may be different, depending on the strategies they use in the learning processes. These seemingly not-so-favorable results come close to Drummond and Sauer's (2015) results. These authors indicate that there is a disposition towards higher scores for those who play less frequently. Hypothetically, we can infer that the fact that teachers are not using games in their classes also originates from a negative view by society, and prevents students from being aware of their learning from games. Designers can consider how to incorporate more elements that enable the mobilization of cognitive strategies in addition to the consolidation of metacognitive strategies. On the other hand, professors can carry out a planning focused on the implementation of digital games that give students opportunities to mobilize cognitive and metacognitive strategies.

Among the participants, there is a prevalence of digital games of RPG, Strategy, and Action (Table 3), with a higher incidence among those who indicated being between 18 and 22 years old (48.5%). This result is relevant for professors, who can focus on planning didactic strategies involving these types of games. Designers can also consider this result so that in the development of new games they can privilege

these types of games, as well as rethinking which elements can be incorporated into other types of games, in order to make greater use of them. One possible correlation between the type of games and metacognitive mobilization lies in the fact that role-playing, action, and strategy games require more attention from the players in order to find the alternatives in the face of the challenges presented in the games. This element is relevant from the perspective of planning the use of games in the classroom. The preference for games that motivate concentration are the most indicated.

Table 3. Frequency for each age range by type of game

Age range	Type of game								%
	Action	Adventure	Emulation	Strategy	Other types	Puzzle	RPG	Simulation	
18 to 22 years	20.2%	8.2%	1.1%	17.2%	10.5%	12%	21.7%	9%	100%
23 to 27 years	14%	12.3%	1.2%	22.2%	11.1%	7%	22.8%	9.4%	100%
28 to 32 years	5.2%	8.6%	0.0%	25.9%	3.4%	8.6%	43.1%	5.2%	100%
33 to 37 years	10%	5.0%	0.0%	30.0%	5%	35%	0.0%	15.0%	100%
38 years or more	17.1%	20.0%	0.0%	31.4%	8.6%	11.4%	5.7%	5.7%	100%
Total	16.2%	10.2%	0.9%	21.1%	9.6%	10.9%	22.5%	8.7%	100%

Based on the results of the ICMSDG, it is possible to analyze the implications of playing time in relation to the mobilization of cognitive and metacognitive strategies. Such considerations were made from three categories: (a) Average time playing; (b) Playing frequency; and (c) How many years playing. The study of the relationship of the mobilization of metacognition over time starts from Moncart's (2012) understanding that there is a cumulative effect on metacognitive awareness of all the games a person has played. For the author, metacognitive awareness is not likely to measurably increase by playing a game for a relatively short period of time.

Regarding the average amount of time playing (Table 4), the data also indicate that those who declared playing more time per week mobilize more cognitive and metacognitive strategies, agreeing with the assumptions of Moncarz (2012). That is, there is a positive growth in the mobilization of these strategies from the average time playing per week: students who play more than 5 hours per week mobilize more cognitive (average=22.4) and metacognitive strategies (average=57.9), compared to those who play less time (e.g., averages are 15.2 and 51.8, respectively, for those that play less than 1hour/week).

Table 4. Averages for Cognitive and Metacognitive strategies by time playing

	Cognitive Strategies assessment		Metacognitive Strategies assessment		Total	
Average playing time	Average	SD	Average	SD	Average	SD
Less than 1 hour/week	15.2	6.36	51.8	8.22	67.1	11.2
1 to 2 hours/week	17.1	6.17	53.8	6.70	70.9	10.5
2 to 3 hours/week	18.2	6.18	52.7	7.29	70.9	11.3
3 to 4 hours/week	18.3	6.18	54.1	7.81	72.4	11.9
4 to 5 hours/week	20.4	4.69	55.1	5.36	75.5	8.37
5 hours/week or more	22.4	7.03	57.9	6.45	80.4	11.4

Note. SD=Standard Deviation.

Regarding the frequency of play, as shown in Table 5, there is a higher average for those university students who claim that they play every day (Cognitive Strategies=18.7; Metacognitive Strategies=54.5 and Total=73.2), followed by those who indicate that they play a few days a week. These results reveal that those who play every day tend to mobilize more cognitive and metacognitive strategies.

These results indicating increased mobilization of metacognitive strategies by those who spend more time playing is consistent with the studies by Castronovo et al. (2018). It is observed in this result that sporadic use as an intentional educational strategy may not offer the expected results. Planning is required for a more systematic use of games.

Table 5. Frequency of play

	Cognitive Strategies assessment				Metacognitive Strategies assessment				Total			
	1	2	3	4	1	2	3	4	1	2	3	4
Average	17.6	14.6	17	18.7	53.1	51.6	52.2	54.5	70.7	66.2	69.2	73.2
Q1	13	11	13.8	13	49	47	48	49	64	60	61	64
Median	17	14	16	18	53	53	52	55	71	67	68.5	73
Q3	21.3	17.8	21	23.5	59	58.8	57.5	61	77	73.8	76.3	81.5
SD	6.03	5.69	5.40	7.30	6.87	8.89	7.35	7.47	10.5	11.7	9.75	12.5

Note. 1=A few days per week; 2=Sporadically; 3=Weekends; 4=Every day; Q1=1st quartile; Q3=3rd quartile.

Regarding the frequency of play, as shown in Table 5, there is a higher average for those university students who claim that they play every day (Cognitive Strategies=18.7; Metacognitive Strategies=54.5 and Total=73.2), followed by those who indicate that they play a few days a week. These results reveal that those who play every day tend to mobilize more cognitive and metacognitive strategies.

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Table 6. Number of years students play

	Cognitive Strategies assessment			Metacognitive Strategies assessment			Total		
	1	2	3	1	2	3	1	2	3
Average	16.4	16.7	18	52.2	52.1	54.3	68.6	68.8	72.3
Q1	11	12	14	47	49	49	60	61	65
Median	15	15	18	52	53	55	68	69	72
Q3	20	21	22	59.5	58	60	75	75	79
SD	7.12	6.13	6.10	7.88	7.22	6.73	12.1	11	10.6

Note. 1=1 to 4 years; 2=5 to 8 years; 3=9 years or more; Q1=1st quartile; Q3=3rd quartile.

For students who indicated that they have been playing for 9 years or more, there is a higher result in the assessments in Cognitive Strategies (median=18), Metacognitive Strategies (median=55) and Total (median=72), when comparing with the remaining groups of students. These results correspond to the results of those who play every day, as previously reported. Considering the number of years' students report playing, with the analysis from the Kruskal-Wallis test, the results gave a χ^2 of 11.5 for Cognitive Strategies, χ^2 of 10.5 for Metacognitive Strategies, and χ^2 of 16.4 for the Total. The effect size of the difference in scores is small (Cohen, 1992), with ε^2 below 0.20. With this study's sample, in relation to the number of years playing, we cannot infer that there is a change in the mobilization of cognitive and metacognitive strategies. A new hypothesis was raised from the result that, apparently, players who play many hours have the tendency of stagnation or decrease of cognitive and metacognitive strategies. As no new challenges are posed, or as players enter a comfort zone, they do not need to operationalize new efforts, which does not imply mobilization of new strategies.

4. Study limits

The results of this study indicate that digital games provide opportunities to mobilize cognitive and metacognitive learning strategies. However, the results also suggest that only two variables influence this mobilization: type of game (Table 3) and time played (Table 4 and 5). The number of years playing, and frequency of play were not found to have an influence. Other studies, including observation or an experimental approach, may present data to support the identification of other variables that should be taken into account.

In the literature, as in this study, there was no evidence of data collected specifically in higher education teacher training courses. It is understood that teacher training, in addition to epistemological issues, should also seek training for the development of learning strategies since these are necessary for the development of learning. Thus, future studies could focus on data collection with students from these higher education courses that qualify for teaching work. Given the finding of a probable stagnation of metacognitive strategies (Table 6), in this aspect, there is a limit to the study, which can be extended with the adoption of other research projects, including, in the long term, the search for data that can answer the new hypothesis presented. It will be necessary to analyze other data collection instruments that reveal elements that support the statement.

5. Conclusions

In agreement with the literature, this study's results suggest that digital games mobilize Knowledge of cognition and Regulation of cognition, two main categories of metacognition according to Schraw and Dennison (1994). In the crossing of data on the age group with the types of games used (Table 3), a strong indication for the preferences that should be used in the classroom or even in gamification strategies,

when the results point to those of RPG type, followed by Strategy and Action. Another finding is a greater mobilization of metacognitive skills when observing the time users allocate to gaming, described in Table 4, 5 and 6. Hence, an increased use of cognitive and metacognitive awareness in relation to time was observed in this sample; that is, respondents who play more, claim to have a higher level of metacognitive skills. This claim is corroborated by the indicators in the table of frequency with which they play (Table 5). Observing people who play sporadically, it is seen that they are the ones with the lowest results, highlighting that the frequency at which students play is directly related to greater activity, both cognitive and metacognitive.

Considering the number of years, the respondents play (Table 6), it is clear that the metacognitive resourcefulness is much greater than the cognitive one; that is, there is greater control, thinking and strategies that have been refined over time in gaming practices. In this way, the metacognitive knowledge acquired to guide the player in deciding which strategies work best for a given situation strongly demonstrates their awareness of controlling thought and creating strategies to conduct a quick and effective solution.

Authors' Contribution

Idea, FSCP, VBSJ, MMM; Literature review (state of the art), FSCP, VBSJ, MMM; Methodology, FSCP, MMM; Data analysis, FSCP, VBSJ; Results, FSCP, MMM; Discussion and conclusions, FSCP, VBSJ, MMM.; Writing (original draft), FSCP; Final revisions, FSCP, MMM; Project design and funding agency, FSCP, VBSJ, MMM.

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Secondary education students and media literacy in the age of disinformation

Los estudiantes de secundaria y la alfabetización mediática en la era de la desinformación

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ABSTRACT

This paper presents an up-to-date overview of how students in Compulsory Secondary Education (ESO) in Spanish public schools, aged between 11 and 16, approach the media, how they inform themselves, the degree of journalistic discrimination they have, and how they deal with the news in times of an infodemic and disinformation. In addition, it explores the opinion of teachers on the media deficits they perceive in their students. The main research technique used in this study was a descriptive, cross-sectional survey of 1,651 ESO students from all over Spain with a confidence level of <95% and a ±3% sampling error. In order to delve deeper into some of the main aspects pointed out by students, 77 in-depth interviews were conducted with teachers from all over Spain. The main results highlight that high school students are mainly informed through social networks, television, and their family or friendship groups; that they have difficulties in discriminating between information and opinion; and that, although they consider themselves capable of differentiating between news and hoaxes, more than half are unable to distinguish between fake and real news. According to the teachers in some of these schools, media consumption among students is non-critical, fuelled by the compulsive consumption of audiovisual and digital media.

RESUMEN

Este estudio presenta una radiografía actualizada de cómo los estudiantes de Educación Secundaria Obligatoria (ESO) de centros públicos españoles, de entre 11 y 16 años, se aproximan a los medios de comunicación, cómo se informan, el grado de discriminación periodística que poseen y cómo se enfrentan a las noticias en un momento de infodemia y desinformación. Además, se explora la opinión de sus profesores sobre los déficits mediáticos que perciben en sus estudiantes. La principal técnica de investigación empleada en este estudio ha sido la encuesta de corte descriptivo y transversal a 1.651 estudiantes de la ESO de toda España con un nivel de confianza <95% y un ±3% de error muestral. Para ahondar en algunos de los principales aspectos señalados por los estudiantes se han realizado 77 entrevistas en profundidad a docentes de toda España. En cuanto a los principales resultados destacan que los estudiantes de secundaria se informan principalmente a través de las redes sociales, la televisión y sus grupos de familia o amigos; que tienen dificultades para discriminar entre información y opinión; y que a pesar de que se consideran capaces de diferenciar entre noticias y bulos, más de la mitad no distinguen entre una noticia falsa y una real. Según el profesorado de algunos de estos centros, existe entre los estudiantes un consumo mediático acrítico potenciado por el consumo compulsivo de lo audiovisual y lo digital.

KEYWORDS | PALABRAS CLAVE

Media and information literacy, secondary education, adolescence, disinformation, critical consumption, media.
Alfabetización mediática e informacional, educación secundaria, adolescencia, desinformación, consumo crítico, medios de comunicación.

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1. Introduction

Nowadays, any teenager between the ages of 11 and 16 has the same access and exposure to media content as any adult. As many as 94.8% of adolescents have a mobile phone with internet connection and the average age at which they access these devices is around 11 years old, or even younger (UNICEF, 2021). Fifteen-year-olds have gone from spending 21 hours a week on the internet in 2012, to 35 hours a week in 2018, according to data provided by the OECD. These data demonstrate that there is a need to train students to discriminate between information and opinion and to enhance their critical thinking in the face of information 'ambiguity' (PISA in Focus, 2021). In other words, media education that involves a "critical analysis of messages, ethical and responsible creation of content and citizen interaction" (Marta-Lazo, 2018: 48).

However, the difference between young people and adults when it comes to consuming mass media is not only determined by age, technological resources or life experiences, but also by the fact that the points of reference in the media, or opinion leaders in Lazarsfeld's words, of both generations are becoming increasingly further apart. In addition to this, we encounter the uncritical acceptance of the content generated by these social referents in the web 2.0 by today's youth: "It is precisely the age groups with the highest level of familiarity with Internet safety measures that pay the most attention to internet referents such as influencers" (ONTSI, 2021: 159). In most cases, the opinion that teenagers receive from their influencers does not pass through the filter of the media, where there are certain quality standards that guarantee the veracity of the information. For more than a decade, studies have been highlighting how adolescents uncritically accept and prioritise the aesthetics and language proposed by the media (Dussel & Trujillo-Reyes, 2018; Valdivia-Barrios, 2010), an aesthetic and language that is far from a "paused and reflective" consumption, as we are faced with a narrative more typical of memes and slogans (Carrera, 2016).

This situation highlights the difficulties an adolescent has today in consuming information in a conscious and critical way. On the other hand, the importance of improving media and information literacy skills in schools through the national curriculum is becoming evident (Medina-Cambrón & Ballano-Macías, 2015; Osuna-Acedo et al., 2018; Pérez-Ortega, 2016; Wilson et al., 2011). This latter measure is supported by Europe, which has long been advising member countries (European Commission, 2018), in line with the warnings of international organisations such as the UN (Aguaded, 2012), of the need to introduce media and information literacy (MIL) in schools and to make it a measurable skill. From this perspective, a new platform has been created in Spain, promoted by a hundred professors of Communication and Education, in favour of educommunication in Spain, which claims the need to incorporate teachers specialised in Communication into the Spanish educational system (Marzal-Felici & Aguaded, 2021). This initiative supports the long-standing demands of the Federation of Spanish Journalistic Associations (FAPE) for the inclusion of a media literacy subject at secondary school level.

1.1. Media literacy in formal education in Spain

The relevance of the project resides in the fact that, in Spain, there is no national-scale research nor any up-to-date reports from the time of the pandemic that allow a better understanding of the reality of media literacy in public ESO establishments, at least not from the point of view of students and the opinion of their teachers within the same social situation, that is conducted in a practically synchronous way and that approaches the present context truthfully. Furthermore, this paper comes in the wake of the COVID-19 confinements and their consequences for secondary school students themselves: 57.9% of Spanish adolescents' report feeling saturated with Internet and social media use during confinement (UNICEF, 2021). ESO is the most neglected stage in the field of information, although it is, without a doubt, the most relevant, since it serves as a bridge to the adult world (vocational training, university studies, etc.).

Some academic studies have approached the subject on a regional level. For instance, Medina-Cambrón and Ballano-Macías (2015): 256) studied media implementation in some schools in Catalonia and concluded that "the existence of media and ICT education depends on the will of a few conscientious and committed teachers"; the research led by Manuel Castells and Inma Tubella which analysed the process of Internet integration in primary and secondary education in representative schools in Catalonia

(Mominó et al., 2008); or the work of Aguaded et al. (2015) who analysed the degree of media competence in the dimension of technology in the primary and secondary school population in Andalusia, where they observed a deficiency. There is also national research that has explored the level of students' media competences and the presence of media content in the different subject areas at different educational stages (García-Ruiz et al., 2014).

Some research has analysed the role of the different individuals with whom adolescents spend most time in a social environment (family and school), with the understanding that media education should be based on all the individuals who actively participate in the life of this group. Therefore, it is necessary for families to pay attention to the way in which young people consume media content and to encourage critical and responsible consumption (González-Fernández et al., 2018). This should also be addressed at school, where teacher training in media literacy is essential (Gutiérrez-Martín & Torrego-González, 2018; Martínez-Izaguirre et al., 2021). Other authors have focused on different educational stages such as primary education, where media literacy can begin to be developed (Pérez-Rodríguez et al., 2015), or higher education, with emphasis on careers or studies related to communication or information sciences (Tucho et al., 2015). At university level, there is also a growing interest in the use of new technologies, such as social networks, in lecturers' teacher training practice (Bista, 2015; González-Aldea & Herrero-Curiel, 2020; Tang & Hew, 2017), with an emphasis on the implementation of new educational applications and platforms in the classroom.

The COVID-19 health crisis has only highlighted all the weaknesses in media skills in society, "in the midst of a health and information pandemic, it is clear that media literacy should be an absolute priority on the agendas of our educational authorities and representatives" (Marzal-Felici, 2021: 12). This does not mean that the adolescent population is more media illiterate than the older population; however, they are more vulnerable if they do not have sufficient tools to cope with the enormous amount of information they receive on a daily basis. In short, drawing up a map of needs at the compulsory secondary education stage, with the help of the centres involved, seems essential in order to comply, not only with the guidelines that come from Europe, but also with a deeper and more internal reflection that starts with the question of whether we would prefer to have citizens who simply learn how to use technology or who go a step further in understanding the uses and contents that are conveyed through it.

On the basis of the current state of affairs presented in this paper, the general objective of the project is to obtain an in-depth analysis of the current state of media literacy among students in compulsory secondary education in Spain. The specific objectives that address the different aspects of the object under study are listed below:

- Analyse the reading habits of secondary school students.
- Find out which digital media or digital platforms secondary school students use for information.
- Analyse whether secondary school students are able to discriminate between news and opinion genres.
- Find out students' aptitude for identifying disinformation circulating on the Internet.
- Find out what some of the teachers think about the media skills of their pupils.

2. Material and methods

2.1. Design and sample of the study

This study is based on a methodological three-way approach that combines descriptive and cross-sectional quantitative research through surveys and qualitative interviews through unstructured standard interviews, thus enriching the quantitative analysis. In this way, a mixed research design was followed, combining qualitative and quantitative approaches to data collection and analysis.

The study sample consisted of all the secondary school students enrolled in public schools throughout Spain, excluding those belonging to Secondary Education for Adults. According to the latest advanced statistical data on the academic year 2020-2021 published by the Ministry of Education and Vocational Training (2021), the population of this study is 1,354,684 students enrolled in public ESO centres, so it was established that the sample should be at least 1,060 students, with a confidence level of <95% and a ±3% sampling error. In the end, a sample of 1,651 students was obtained.

The sample was selected by random sampling from a list provided on 18th January 2021 by the "State Register of Non-University Teaching Centres", which is part of the "Deputy Directorate-General of Centres, Inspections and Programmes" of the Ministry of Education and Vocational Training. At that time, there were 4,518 centres in Spain with the characteristics required by this research.

In order to explore this quantitative data further, it was decided to interview teachers involved with the students being surveyed and who were familiar with the curricular content of their schools. The qualitative sampling of this part of the project was based on grounded theory and the principle of theoretical saturation in two phases of Francis et. al. (2010). It specified "a priori" that teachers from all the autonomous communities and cities of Spain should participate in the interviews and it was established that interviews should be stopped when no new themes emerged, according to the analysis of co-occurrences carried out with the Atlas.ti software. The interviews (n=77) were coded according to the General Data Protection Regulation[1].

2.2. Instruments and procedure

The main instrument of measurement in this research was the questionnaire, with an initial survey with 25 closed, direct, single-response questions, four of which collected only descriptive data about the respondent and another 21 divided into three dimensions as follows: five items in the first dimension, nine in the second and seven in the third. A pre-test was then carried out on 25 and 26 February 2021 with a small sample of students. Following this pilot questionnaire, three closed items were removed from the "media consumption" dimension and made open-ended in order to delve deeper into the students' social network and media references. In addition, on the recommendation of the legal team of the university to which the research project is affiliated and in line with the General Data Protection Regulation, the descriptive data item 'population' was removed in order to respect the principle of minimum data consultation. Thus, the final research questionnaire consisted of 23 items: three items to collect demographic data from respondents and 20 items divided into three dimensions as shown in Table 1.

Table 1. Dimensions and items of the survey

Dimensions	Items
Reading habits and reading comprehension	5
Media consumption	8
Aptitudes in the face of disinformation	7

The questionnaire was administered through Google Forms with the help of the teachers involved, who used the tutorial sessions in order to ensure the questionnaires were completed successfully.

As for the other instrument used in this study, the interview, questions based on the literature review prior to the study were developed in order to ascertain the teachers' opinions. The dimensions studied during the conversation were as follows:

- Integration of media literacy in the classroom, where they were asked about the concept of MIL, the transversality of this competence, the subjects where it was addressed, as well as their perception of the inclusion of this competence in education laws.
- Needs perceived by teachers. Although all questions were related to the teachers' perceptions of the students' needs, many answers provided information regarding the training demands of teachers in the pre and post COVID-19 context.
- New challenges for teachers. In this dimension, innovative ways of motivating students within the classroom in MIL were discussed.

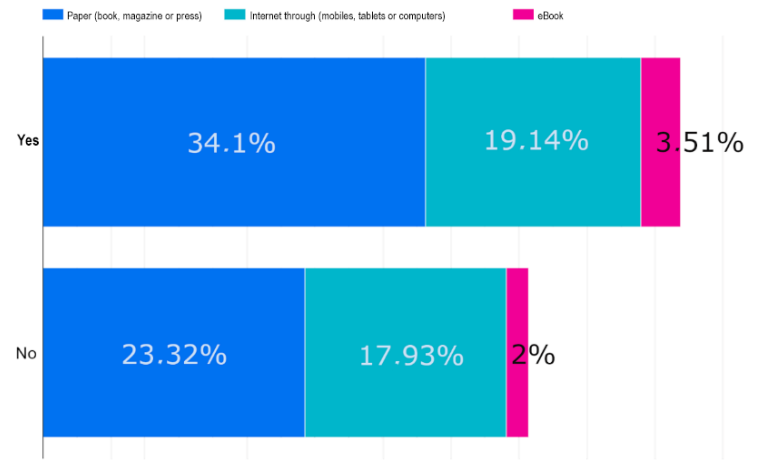
As a standard unstructured interview, additional questions, all related to the object of study and adapted to the context of the interviewee, were incorporated in the vast majority of the interviews. During the interview, these were incorporated at the discretion of the interviewer, as established by the relational interactive approach. The operationalisation of codes and categories was carried out with the Atlas.ti software from the transcripts of the 77 interviews, from which 1,402 units of analysis were extracted with the assignment of 197 codes to each of them. After a process of inter-subjective verification, 1,283 units of analysis and 97 codes remained.

3. Analysis and results

3.1. Reading and media habits

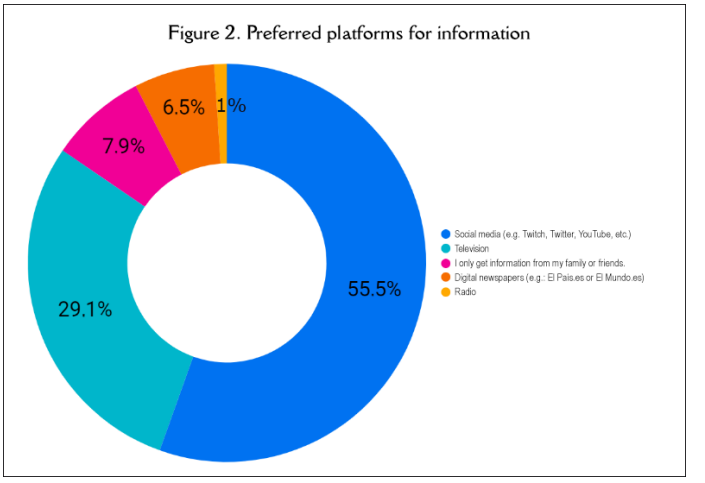
Out of all the secondary school students surveyed, 56.75% say they like to read, compared to 43.25% who confess that they do not like to read. Of the students who highlight their love of reading, 34.1% (n=563) prefer the paper format, followed by the Internet or digital format with 19.14% (n=316) and, less significantly, the e-book with 3.51% (n=58). On the other hand, 23.32% (n=385) of students who state that they do not like reading, also indicate paper as their first choice, although to a lesser extent than the group of students who do like reading. This is followed by preference for the Internet, 17.93% (n=296) and, finally, 2% (n=33) of students choose e-books (Figure 1).

Figure 1. Preferred reading format for students



Bearing in mind that the Internet is the place where young people spend most of their time, one of the questions was whether they were able to correctly understand the texts that they read online. Although almost 88% of respondents said that they do understand what they read on the Internet correctly, half of them, 44% (n=727) said that they only need to read the text once to understand it and the other 43.9% (n=725) said that, although they understand it, they sometimes need to look up the meaning of some words. The remaining 12% indicated that they do not understand the text and specified it as follows: 6.8% (n=113) confessed that if the text is long, they are easily distracted, 3.8% (n=62) that they need to read it a couple of times and 1.5% (n=24) state that they need someone to explain it to them.

Figure 2. Preferred platforms for information



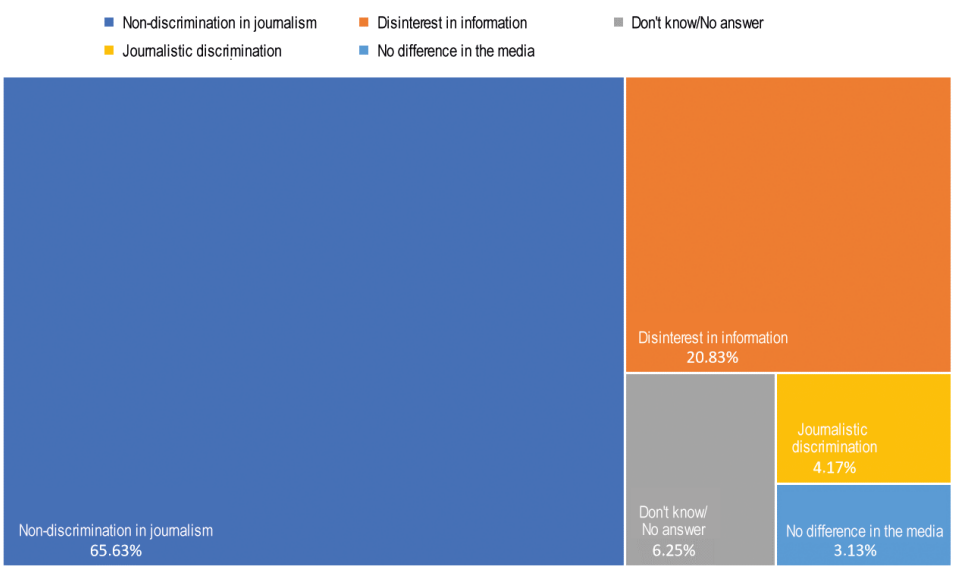
In terms of preferred platforms for consuming news (Figure 2), 55.5% of secondary school students prefer social networks, followed by 29.1% who prefer television. Furthermore, 7.9% of the students surveyed say that they are only informed by their family or peer groups, 6.5% consult the news through digital newspapers and 1% say that they get their news from the radio.

3.2. Information discrimination among secondary school students

A total of 92.1% of secondary school students say they are able to discriminate between information and opinion genres, while 8% of respondents say they are not able to differentiate between information and opinion. However, when faced with a task involving identifying whether a text is informative or opinion, the results indicated that more than half of the students surveyed, 64.4% (n=1,063) confuse an opinion piece with information, compared to 35.6% (n=588) who identify it correctly. In the case of the news genre, the number of correct and incorrect answers was similar, with 52.2% (n=862) getting it right and 47.8% (n=789) stating that it was opinion. Thus, there is a notable difference between students' self-perception of their ability to discriminate between journalistic genres and reality.

On the other hand, the students' high self-perception of themselves does not coincide with the opinion of their teachers, 65.63% (n=63) of whom, in the interviews conducted with them, categorically stated that secondary school students do not know how to differentiate between news and opinion genres when they consume information on a daily basis (Figure 3). In terms of teachers' perceptions, 20.83% (n=20) believe that students show a lack of interest in information when it comes to learning about the reality surrounding them, 4.17% (n=4) believe that students do, in fact, discriminate between information and opinion, and 3.13% (n=3) believe that the responsibility lies with the media, where it is difficult to differentiate between information and opinion content. Finally, 6.25% of the teachers were unable to answer whether they considered their students to be able to differentiate between the two genres.

Figure 3. Teachers' perceptions of their students' journalistic discrimination

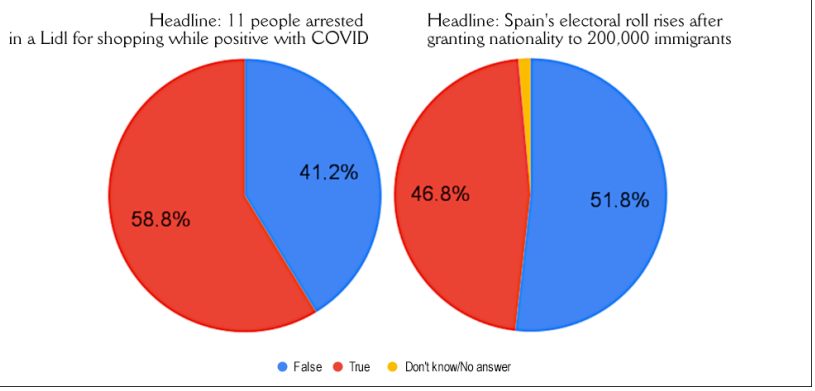


3.3. Aptitudes of secondary school students in identifying disinformation

Given that the phenomenon of disinformation and the viral nature of fake news is greatly amplified by the speed at which messages circulate on social networks, and the fact that any user can produce messages easily, students were asked whether they usually share information they receive via these platforms with friends or acquaintances. More than half of the students (59.2%) said they did, compared to 40.8% who said they did not. As for their self-perception of their ability to distinguish between fake and real news,

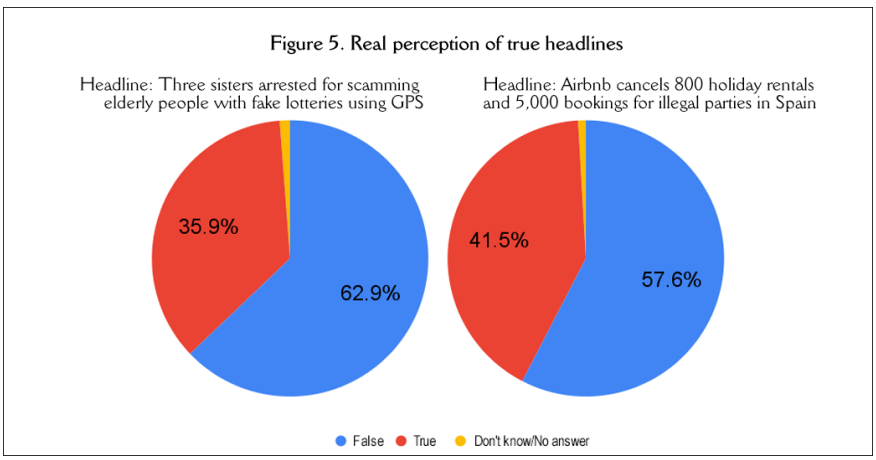
more than half of the respondents (58.8%) consider themselves capable of differentiating between the two, compared to 41.2% who recognise that they are not able to distinguish between them. However, after providing them with several true and false headlines[2], the results show differences from their own beliefs. In terms of the identification of false headlines, more than half (51.8%) considered a headline containing false information about immigration to be true. The false headline about Covid-19 was identified as a hoax by 58.8% of students (Figure 4).

Figure 4. Real perception of fake headlines



In terms of identifying headlines that contained real information, more than half of the students labelled them as false. A total of 62.9% of respondents considered the headline related to a scam involving the elderly to be false, compared to 35.9% who got it right, and 57.6% also considered the news about Airbnb to be false compared to 41.5% who considered it to be true information (Figure 5).

Figure 5. Real perception of true headlines



According to their teachers, secondary school students have a number of deficiencies related to media literacy that make them more vulnerable to disinformation and fake news. The secondary school teachers interviewed pointed out the following characteristics of their students' way of consuming information:

- Uncritical media consumption: according to 38% of the teachers interviewed, their students do not question or doubt the content that they receive through the mass media; in their view, it is a question of media naivety where they consider technology as a dogma of faith.
- Compulsive consumption: 21% of teachers say that students are continuously exposed to different content that reaches them through their mobile devices and that this does not help them to digest or consume all the messages they receive in a more reflective way.
- Disinterest in information: 17% indicate this disinterest as a deficit that they also noted in journalistic discrimination. Teachers consider that students are not interested in getting

information or accessing media beyond what they can find on their social networks. What they exclusively seek is entertainment.

- Digital divide: 10% of the teachers interviewed from various schools reported that some students have deficiencies in writing an e-mail or using telematics applications. One of the reasons for this is that some families do not have internet or electronic equipment at home, such as a computer, and in some households, there is only one computer for the whole family. This divide reinforces the deficits in MIL.
- Audiovisual consumption: 5% indicate that most of the content consumed by secondary school students is video and/or images. According to the opinion of these teachers, this type of content is consumed compulsively and without processing what they are watching.

With regard to the interest shown by secondary school students in the media literacy content that their teachers introduce in some subjects (relevant news coverage, work based on news items, audiovisual fragments or content related to social networks), it should be noted that 50.65% of teachers consider that students are motivated by these activities, compared to 36.36% who say that they do not perceive this motivation and almost 13% who are not clear about it.

4. Discussion and conclusions

The general objective of this research was to find out how secondary school students interact with the different media content they have access to, in order to understand their media consumption habits in post-pandemic times. Media and information literacy is still a pending subject in secondary school curricula. Although some of the teachers interviewed consider that students are not yet mature and that upper secondary school is perhaps the most appropriate time to introduce issues related to MIL, the truth is that this intervention in media education is probably happening too late since, as has been seen in the reports referred to in the theoretical framework, access to media content or social networks through mobile devices is occurring at increasingly younger ages. This reality makes it necessary to know what adolescents between 11 and 16 years of age are doing with this content and, of course, to know the opinion of their teachers, who are the ones on the front line trying to bring this transversal competence, which is something of a mirage in compulsory secondary education centres, into the classroom.

Regarding the reading habits of secondary school students, it should be noted that, contrary to what one tends to think, the majority of students have admitted that they enjoy reading and those who say they like to read, prefer to do so in paper format. This is in line with the latest report presented by the Spanish Publishers' Federation, which indicates that, in 2020, after the confinement, the number of frequent readers of books during leisure time has grown, reaching 79.8% in the 10 to 14 age group and 50.3% in the 15 to 18 age group. The Internet is the second format of choice for secondary school students, while e-books do not seem to be incorporated into students' reading habits, at least for the time being.

The secondary school students surveyed indicate that social networks and television are the platforms they use most when it comes to getting information or consulting news. This reinforces the findings of more recent studies on the media habits of young people (Ballesteros et al., 2020). In this study, young people aged between 15 and 29 years specifically indicate that television is their first choice (52.6%), followed by social networks (41.4%). This is something that varies in our study, where it seems that in the age group studied (11-16 years), social networks are preferred. In both cases, social networks and television deal with narratives that are very close to this audience and are largely carriers of "infotainment", a television phenomenon that has spread to the rest of the media (Berrocal-Gonzalo et al., 2012). What is relevant, both in this study and in the one mentioned above, is that family members or peer groups are the third option indicated by young people for receiving information, even ahead of digital newspapers, something that favours disinformation and the proliferation of fake news. The least consulted medium is radio, precisely one of the most informative media, which helps to understand why these secondary school students are not able to name any journalist other than influencers, as has been confirmed in the research presented here. The main results detected indicate that secondary school students, despite being used to surfing the internet and using social networks on a regular basis, show a deficit in basic skills related to

media literacy, ranging from the correct discrimination of journalistic genres (information vs. opinion), to the lack of skills in distinguishing between real and fake news (PISA in Focus, 2021). These results do not differ much from those found in the general population with questions of the same nature asked by the Psychology of Testimony research group of the Complutense University, in which it was found that 6 out of 10 Spaniards claimed to distinguish a fake news story from a real one, but in reality, 86% confused them (Simple Logic, 2017).

Another finding is that secondary school students' self-perception of their ability to discriminate between truthful information and misinformation is higher than their results in distinguishing between false and true headlines. This is a similar conclusion to that found in the study on observed and self-perceived information literacy skills of secondary school students in a high-performing PISA region in Spain (García-Llorente et al., 2020), where, again, students' self-perception of what they could do was higher than reality.

Secondary school teachers report a lack of critical thinking when dealing with media content. This could be due to compulsive consumption, generated by the widespread use of mobile devices that contribute to distraction and difficulty in concentrating, or lack of interest in information. In view of this, students should be provided with certain defence mechanisms against the media so that they do not uncritically take messages on board, and it should be the only vaccine against the infoxication that citizens face on a daily basis and which has been worsened by the recent years of the pandemic.

Some teachers indicated that students are motivated to work in the classroom on aspects related to the media or the content they find on the Internet. This motivation on the part of students is likely to be greater depending on the way in which teachers integrate content into their subjects and stimulate their students. According to Buckingham (2005), in order to achieve this level of enjoyment, it is necessary to first work on a metalanguage that helps them to describe and critically analyse the media events that surround them.

Among some of the findings that have emerged from the research, and which teachers themselves have highlighted, is the digital divide. It would be interesting to further investigate whether, in Spain, these socio-cultural inequalities between communities determine a certain inequality in the acquisition of media competences among pupils. In fact, a recent study by the UC3M-Santander Institute of Big Data relates greater consumption of news in traditional online media with greater purchasing power and higher levels of education, compared to consulting news through networks such as Facebook, which is associated with lower purchasing power and lower levels of education (Ucar et al., 2021).

The work presented in this paper opens up several lines of research to continue exploring the current state of media literacy at secondary school level. There are aspects determined by socio-economic variables in the different Autonomous Communities in Spain that are becoming relevant and significant and should be further explored. Likewise, it would be useful to go deeper into the answers that students have given about their media consumption and to work, from a more psychological perspective, on the functions and dysfunctions that the media content they consume fulfills in their daily lives and how the different social networks they use are determined by their peers, school or family. In addition, a gender perspective could be addressed in determining whether or not the motivations of men and women are different. In this case, focus groups would have been useful as a complement to the techniques used, but the limitations of time and resources make it necessary to seek other sources of funding to continue developing a project that is very much alive and could be replicated on an international level to compare what is happening with this same population in other countries.

Notes

[1]The Respondent Coding Table can be found in the Figshare data repository at doi: https://doi.org/10.6084/m9.figshare.16586942.v3. This has been done in accordance with Article 25. 2 of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

[2]The false headlines come from two hoaxes that spread through social networks and have been extracted from the verification platform Newtral, which was responsible for denying them. The real headlines correspond to two news items taken from the EFE news agency.

Authors' Contribution

Idea, E.H; Literature review (state of the art), E.H., L.R; Methodology, L.R.; Data analysis, L.R., E.H Results, E.H; Discussion and conclusions, E.H.; Writing (original draft), E.H.; Final revisions, L.R., E.H; Project design and sponsorship, E.H.

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Invisibilised human rights: Trafficking in human beings in the media in Spain

Derechos humanos invisibilizados: La trata de seres humanos en los medios de comunicación en España

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ABSTRACT

The aim of this research is twofold: to examine the coverage of human trafficking in the digital press and the perceptions of media professionals and specialised entities regarding such news. The methodology employed is mixed and relies on the technique of content analysis of news stories between January 2019 and December 2020 to investigate how the phenomenon is addressed by digital newspapers. This is also combined with the semi-structured interview technique to identify the discourse of media professionals and the heads of specialised non-governmental organisations in relation to their assessment of the news production on trafficking in Spain. There is lack of information on trafficking of human beings, partly due to the lack of media resources to inform and investigate. The trafficking of human beings for the purpose of sexual exploitation continues to dominate media coverage. Addressing the trafficking of human beings from a holistic and human rights approach, including the visibility of all forms of trafficking, as well as deepening collaboration and cooperation between the media and specialised entities, are tasks of vital importance for further progress.

RESUMEN

El objetivo de esta investigación es doble: examinar la cobertura de la trata de seres humanos en la prensa digital y las percepciones de los profesionales de dichos medios de comunicación y de las entidades especializadas respecto a dichas noticias. La metodología empleada es mixta y se apoya en la técnica del análisis de contenido de las noticias entre enero de 2019 y diciembre de 2020 para investigar cómo se aborda el fenómeno por los diarios digitales. Asimismo, esto se combina con la técnica de la entrevista semiestructurada para identificar el discurso de los profesionales de los medios y de los responsables de las organizaciones no gubernamentales especializadas en relación con su valoración sobre la producción informativa en materia de trata en España. Se observa una carencia de informaciones que hagan referencia a la trata de seres humanos, debido en parte a la falta de recursos de los medios para informar e investigar. La trata de seres humanos con fines de explotación sexual sigue imperando en la cobertura de los medios de comunicación. El abordaje de la trata de seres humanos desde un enfoque integral y de derechos humanos, contemplando la visibilización de todas las formas de trata existentes, además de la profundización en la colaboración y cooperación entre medios de comunicación y entidades especializadas, son tareas de vital importancia para seguir avanzando.

KEYWORDS | PALABRAS CLAVE

Human rights, trafficking of human beings, media, digital journalism, qualitative analysis, social representations, information message.

Derechos humanos, trata de seres humanos, medios de comunicación, periodismo digital, análisis cualitativo, mensaje informativo.

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1. Introduction

Trafficking of human beings is understood as the process by which a person is recruited, transferred, and received for subsequent exploitation, through the use of force, threats, abduction, fraud and, abuse of a situation of need or of a situation of power on behalf of the trafficker. This definition is included in several international and national legal documents, such as article 3 of the United Nations Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children (United Nations Office on Drugs and Crime, 2000), article 4 of the Council of Europe Convention on Action Against Trafficking in Human Beings (2005), and Organic Law 5/2010, of 22 June, which introduces, in article 177 bis1 of the Criminal Code, the criminal offence of trafficking human beings.

In addition to this conceptual delimitation, and bearing in mind that trafficking of human beings is a very complex phenomenon, the relevance of its dimension and extent must be highlighted through the data recorded. The existence of a "dark figure" makes it extremely difficult to obtain reliable empirical data that would provide a true and global perspective of the problem. This is conditioned, to a large extent, by the very definition of the concept of trafficking, its invisible or hidden nature, the lack of valid mechanisms that guarantee the correct identification of victims, methodological problems in data collection, among others (Carrillo & De-Gasperis, 2019; Cabrera, 2017; Villacampa & Torres, 2021; Villanueva & Fernández-Llebrez, 2019).

However, for some years now, work on data collection has been carried out by different international and national bodies. Currently, according to the latest report of the United Nations Office on Drugs and Crime (2020), "Global Report on Trafficking in Persons", 50% of the detected victims, mostly women and girls, are sexually exploited, and 38% of the victims are exploited for labour exploitation, while 6% are exploited for forced criminal activities and more than 1% for begging. Victims of forced marriages, organ removal and other purposes are the lowest percentage. This reality is again highlighted in EUROPOL's latest SOCTA 2021 Report (2021), which notes that sexual exploitation is prevalent in all Member States, although without a significant increase in the last four years.

In the case of Spain, and according to the Statistical Balance (2016-2020), "Trafficking and exploitation of human beings in Spain", it is observed that women and girls continue to be the most frequent victims of trafficking for the purpose of sexual exploitation, with 145 women and 2 girls (2020). With regard to trafficking for the purpose of labour exploitation, in the year 2019, men represent the largest number of victims with a total of 103 adults and 6 minors. However, in 2020, the trend is reversed and women are the most frequent victims with a total of 65 and only one case of a girl registered, compared to 33 men. For the remaining types of trafficking (forced marriages, for criminal activities, and begging), data are very scarce, following the trend recorded in international reports, and representing only the tip of the "iceberg".

Changing this situation requires the commitment of all actors involved in the field of human trafficking (legislators, judges, prosecutors, State Security Forces, Public Administration, civil society as a whole, including the media). This is because the media play a central role in constructing our images of reality (Lippmann, 2003). Thanks to the media, we can learn about our surroundings and have a vision of what is happening, a vision that in most cases could not easily be acquired, given that we are not at the scene of the events or "because most of the issues that interest us are outside our direct personal experience" (McCombs, 2006): 23). This is the case of trafficking of human beings that reaches public opinion through the media.

There are several studies that address human trafficking, mainly for the purpose of sexual exploitation and prostitution, through content and discourse analysis from agenda-setting perspectives, showing the coverage of the phenomenon in the media (Antolínez-Merchán & Cabrera-Rodríguez, 2018; Bozorova, 2019; Gregoriou & Ras, 2018; Gulati, 2010; Johnston et al, 2015; Krsmanovic, 2020; Madueño-Hidalgo & Sierra-Rodríguez, 2019; Rusnac, 2019; Sanford et al., 2016). However, there are no studies that address the perspectives of media professionals, except when studying human trafficking linked to prostitution (Fernández-Romero & Simón-Carrasco, 2019).

There is also a plethora of rules, recommendations and manuals from institutions working in the field of trafficking directed at the media (EU Anti-Trafficking Action, 2016; APRAMP, 2015, Barcelona City Council, 2015; Madrid City Council, 2014; Community of Madrid, 2015; Doctors of the World, 2017;

Save The Children, 2013; Commission for Refugee Aid in Euskadi, 2018), but their perceptions regarding the implementation of these recommendations have not been assessed.

Thus, in order to fill in the gaps in the perspectives of journalists covering human trafficking in Spain and specialist organisations working with victims of trafficking, the following research questions are posed: What image of human trafficking does the media portray? How does this image relate to the daily demands of news production in the media? What is the process for news production and the role of sources? What difficulties do they face? What is the approach? What is the relationship between specialist entities and the media?

2. Material and methods

The methodology underpinning this research is based on three axes:

a) News stories dealing with trafficking in human beings from different journalistic genres are selected from those considered to be the most objective narrative within the journalistic discourse.

b) The discourse of media professionals involved in the coverage of human trafficking.

c) The discourse of NGOs that direct their work towards trafficking of human beings.

In order to carry out research based on these three axes, a combination of quantitative and qualitative methodology is proposed: The quantitative methodology is applied to find out how human trafficking is dealt with in the media, using the technique of content analysis of news on human trafficking published in the most popular digital newspapers. The qualitative methodology is used to find out the discourse of news production in relation to human trafficking; open or semi-structured interviews with journalists and representatives of relevant organisations in the field of human trafficking are used to find out their interpretation and assessment of the messages and the news production.

The characteristics of quantitative content analysis, as a "technique for the objective, systematic and quantitative description of the overt content of communication" (Berelson, 1984, in Cea-d'Ancona, 1999: 351), are particularly valid for the analysis of written and documentary material, as is the case of journalistic news. The choice of the semi-structured interview as the qualitative technique applied in this research is based on its suitability for investigating the level of practices (of information production) as well as on the possibilities it offers for gathering evaluative assessments of these practices (Alonso, 1995).

2.1. Content analysis

Objective criteria were used to select the media. The ranking of generalist digital newspapers compiled by Comscore was taken into account. Of the 10 most read generalist digital newspapers in Spain in 2019, 6 digital newspapers have been selected, of which four are the newspapers positioned at the top of the audience ranking according to Comscore (elpais.com, elmundo.es, la vanguardia.com and abc.es) and the two best positioned digital natives in the ranking (elespañol.com and elconfidencial.com).

The time frame of the news published in these newspapers is from 1st January 2019 to 31st December 2020, using the specialised search engine MyNews and the term "trafficking of human beings". The information units extracted from the above-mentioned search were 795 news items. After eliminating repeated news items and discarding those texts in which the term was only mentioned, but did not form part of the central theme of the news item, the sample was of 449 news items.

Table 1. Number of news items and sample per newspaper

Newspaper	Website	No. of news items on human trafficking (2019-2020)	No. of news items selected Sample (2019-2020)
La Vanguardia	www.lavanguardia.com	93	45
ABC	www.abc.es	338	195
El País	www.elpais.com	86	44
El Mundo	www.elmundo.es	71	44
El Español	www.elespañol.com	36	17
El Confidencial	www.elconfidencial.es	171	104
Total		795	449

Based on the selected news items, the information was coded according to the content analysis sheet. This sheet includes the following variables and categories:

- Media (lavanguardia.com, abc.es, elpais.com, elmundo.es, elespanol.com and elconfidencial.es).
- Types of human trafficking (sexual exploitation, labour exploitation, organ trafficking/extraction, forced marriages, begging, trafficking for forced criminal activities and unspecified).
- News item topic (police, judicial, politics, culture/society, other).
- Author of the news item (with identification of the author, without identification of the author).
- Type of sources (police, civil guard, judicial, NGOs, governmental, victims' testimonies, political parties, trade unions, media/journalists, news agencies and others).

In accordance with the above categories, the information was quantified by means of an analysis of frequencies (absolute and percentage) of occurrence.

2.2. Semi-structured interviews

Seven semi-structured interviews were conducted: Five with media professionals (journalists). The sample selection criterion was their extensive experience in the profession and in covering the phenomenon of trafficking of human beings. Initially, 12 journalists were selected (two per media outlet), five of whom expressed their willingness to be interviewed. Two interviews with NGO leaders were also made. The criterion for selection was the extent of their track record in the fight against, and assistance to victims of, human trafficking from a human rights perspective.

Table 2. Profile of interviewees

Interviewee code	Job title	Years of experience
E1	Journalist. El Confidencial	More than 20 years (professional) and 6 years in human trafficking
E2	Gender correspondent. El País	More than 15 years (professional) and 5 years in human trafficking
E3	Journalist. El Mundo	More than 30 years (professional) and 18 years in human trafficking
E4	Journalist. ABC	More than 20 years (professional) and 12 years in human trafficking
E5	Journalist. Freelance	More than 30 years
E6	Coordinator. NGO	More than 22 years
E7	Management. NGO	More than 25 years

The script for the interviews with journalists was structured with a total of 14 questions grouped into three dimensions:

- Dynamics of the media's work: the process of news production and the sources of information used by the journalists interviewed.
- Approach to the treatment of the news: knowledge and use of the action guides for the media drawn up by specialist bodies in the field.
- Assessment of the current work and aspects for improvement in the treatment of the news: assessment of the informative treatment of human trafficking in the media in Spain and the improvements that should be made to tackle the phenomenon, from a general approach and from the media itself.

For the interviews with NGOs, another script was developed with a total of 10 questions grouped into three other dimensions:

- Contextualisation of trafficking in human beings in the media: assessment of the media's approach to trafficking in human beings; the role played by the media in making the phenomenon visible and raising awareness, and the evolution of the media's treatment of news on the subject.
- Media and NGOs: relationship between the media and NGOs, the latter as sources of specialised information; existing working dynamics between the two actors.

3. Analysis and results

3.1. News production

When dealing with a news item on human trafficking, journalists state that the process is the same as for the elaboration of any other news item, with the media receiving the information "in a packaged

manner" through a press call, press conference, conferences or reports, or through an "active search" for this type of information. The latter, which is also called "proactive", is the one that comes from the professional or the media itself to cover certain information or a certain aspect of trafficking.

However, all journalists agree on the scarce coverage given to human trafficking, which is dealt with at specific moments that coincide with specific dates. Therefore, human trafficking is not incorporated into the media's agenda as an ongoing issue. Among the reasons mentioned in the interviews, is its lack of presence in the political agenda, which, together with the lack of interest on the part of the media, results in a lack of attention from media professionals on this issue. Also, relevancy factors are involved in the decision to publish an article or not. One of them is related to the emotion or human interest of the information, as well as personal stories to stir people' consciences.

Another of the factors is the novelty of the news item, and finally, there is the criteria of accessibility. If the journalist can obtain information easily, they are more likely to consider writing a story than if they find it very difficult to access details or sources. According to the content analysis carried out, of the news items in which the sources appear, almost six out of ten sources that appear in the media when reporting on human trafficking belong to the State Security Forces and Corps.

Table 3. Types of sources

Types of sources	Frequency	Percentages
Police	162	39.6%
Governmental	66	16.1%
Judiciary	58	14.2%
Spanish Civil Guard	54	13.2%
NGOs	27	6.6%
Victims	13	3.2%
Media/journalists	10	2.4%
Political parties	6	1.5%
Syndicates	3	0.7%
News agency	1	0.2%
Other	9	2.2%
Total	409	100%

The National Police and Civil Guard, as well as government agencies, provide information mainly through press releases and press conferences. Their presence as a source is evidently much greater than that of any other group, due to the fact that for some journalists it is the "most fluent and constant relationship" (E4). However, despite this relationship with the sources, it is not always easy to make the phenomenon visible because, for some interviewees, "the police are very reserved and the prosecutors the same, they are not used to dealing with the media" (E1).

Finally, working conditions themselves are another of the elements that influence the production of news. Journalists consider that the technical demands of news writing, together with the lack of personnel, mean that the time required to prepare the news is shorter, which has repercussions on the final production (E4, E5). NGOs also highlight the lack of training of some journalists, as they consider that some of them are "very young people who are still inexperienced" (E6), which, together with the lack of time "covering many hours of work" (E6), does not allow for them to focus or go into the depth required to provide the coverage this phenomenon deserves, often contacting the NGOs "by telephone and with great urgency" (E7). However, the NGOs state that there is a very unequal treatment depending on the media, finding media that "are aware and have dedicated, for example, weeks of work to produce different regular publications on the issue of trafficking, with different series, with the participation of many interlocutors to show a very complete perspective" (E6).

3.2. The role of the media in raising visibility and awareness of human trafficking

All the discourses agree on the existence of the fundamental role that the media can play in raising visibility and awareness, because "if the media do not play their true role, the role that the entities or the police or the Prosecutor's Office believe they have to play, this is completely invisible" (E7). To this end, "it should have a more active role (...) it should be done in a way that involves the readers, the viewers, because very often this type of information sounds to us like something far away, that does not concern us, that does not correspond to us" (E2), and the professionals should be aware of the social function of their

work: "All of us journalists cannot lose sight of the social function of journalism, but even more so those of us who are dedicated to issues that involve people and the weakest part of the person, and I believe that this work can be much more active" (E4).

One aspect that emerges in the discourse of the interviewees when dealing with news related to human trafficking is the lack of "specialisation". On the one hand, it is indicated that in the media there is no area in charge of, or dedicated to these aspects or a person specialising in this area (E3). On the other hand, specialisation is linked to training, hence its necessity to address this issue.

This lack of specialisation or training has repercussions on the inadequate use of written language, because "very often they don't even know how to say women, how to say trafficked women, how to say sexually exploited women, how to say prostituted women" (E7), and also in the visual language "where in the raids they come out with their backs turned so that they are not seen, but with their heels on, with ladders in their tights, with their asses out" (E5). "Such training is necessary because not everyone can know about all the issues" (E7) and if "instead of saying 'whoremonger' you say 'clients' you are normalising" (E5). And not only is there a need for training or specialisation, but there is also the lack of "political, social and journalistic" sensitivity (E3), which should be developed prior to specialisation and that "this sensitivity does not exist either because there is no training" (E5). If we look at the way in which the written and audio-visual media communicate the news, it is important to point out the assessment made by the interviewees when considering the existence of more prepared, committed and sensitive media than others, "(...) I believe that we can talk and that there are more sensitive and less sensitive media" (E7), and there is a need to "continue working on awareness-raising, training and commitment of the media (...)" (E6).

Some journalists prefer to use the term "responsibility" (E2), considering that there has been an evolution in this respect and now the coverage is much more responsible, "we approach it with more head, with better work, with better craft" (E2). This lack of preparation is observed in the content analysis in relation to the authorship of the news items. In this respect, it can be seen in the table the percentage of news items that the media outlet conveniently identifies, meaning that they sign their news items either using their full name or the acronym, is only 56.2% in the case of El País, 52.94% in El Español, 47.73% in El Mundo, 15.38% in El Confidencial, 14.43% in ABC and 13.33% in La Vanguardia.

Table 4. Identification of the authors in the news items

Newspapers	No. of news items signs	% of signed news items in relation to published news items
ABC	28	14.43%
El Confidencial	16	15.38%
La Vanguardia	6	13.33%
El País	25	56.82%
El Mundo	21	47.73%
El Español	9	52.94%
Total	105	23.44%

Also noteworthy is the high percentage of journalists whose bylines appear only once over the two years studied (80.00% in El País, 77.78% in El Español, 75.00% in El Confidencial, 66.67% in La Vanguardia and 28.57% in ABC). This need for training, for responsibility, not only needs to occur among journalists, but throughout the entire media structure (E5), because "if we don't train people in what we are seeing, no one will see it" (E7).

3.3. Contextualisation and focus of the news items

In general, all interviewees agree that the evolution of how the phenomenon has been dealt with has been positive, both in terms of understanding and tackling it. All this progress is due to "the evolution that this country has followed with regard to issues of gender violence, I mean from classic violence (...)" (E2), "also as a result of the police plan against trafficking, the change in the penal code" (E1) and that there is "more sensitivity" (E5). However, all agree that there is still much room for progress and improvement.

One such area of opportunity is the type of human trafficking that is covered in the news. The media focus their attention on human trafficking for the purpose of sexual exploitation, which makes other types of trafficking invisible and therefore "there is still a long way to go in terms of addressing and conceiving

trafficking in its full extent, in all its complexity, addressing all forms of trafficking" (E6). The content analysis of the news shows that trafficking for sexual exploitation is the type of trafficking that receives the most coverage in the newspapers (69.0%), followed by trafficking for labour exploitation (18.9%).

Table 5. Type of human trafficking covered in the news (2019-2020)

Newspapers	Frequency	Percentages
Sexual exploitation	310	69.0%
Labour exploitation	85	18.9%
Trafficking or extraction of organs	10	2.2%
Forced marriage	6	1.3%
Begging	1	0.2%
Trafficking for forced criminal activities	0	0.0%
Unspecified	37	8.2%
Total	449	100.0%

Another aspect is the lack of contextualisation of the news item, providing elements to clarify the fact that is being described so that it does not appear in isolation but linked to various informative elements that enrich its comprehension. This contextualisation is lacking in the media and the information would need to be completed, which is why it is necessary to "turn to statistical sources, gender studies" (E3), also that the newsworthy event is framed and that "we see the before, during and after" (E5).

NGOs state that only part of the fight against trafficking is visualised (for example, the dismantling by the State Security Forces), "but there is no mention of what has happened to that woman" (E7). They also consider it necessary to go deeper into the experience of the victims, "to take a little more into account, and this should continue to be emphasised, the role and experience of the experts" (E6), and "in my experience, I believe that the victim's perspective is very effective" (E3). They further state that "the aspects that are not being contemplated, I believe that there is no text that includes all this work, the information is biased, the police information, the prosecution of crime, assistance information from NGOs, I believe that it has to be a combination of all this because otherwise society is not going to understand it" (E7). The content analysis carried out confirms this discourse, where the majority of news items cover state actions and where police operations or prosecutions promoted by judicial institutions are the first actions that newspapers report on in the news.

Table 6. News topics

Topic	No. of news items	% of news items
Police	285	63.47%
Judiciary	72	16.04%
Political	38	8.46%
Culture/ society	23	5.12%
Other	31	6.90%
Total	449	100%

The aforementioned lack of plurality in information sources means that the information provided by the different media is fairly uniform and, above all, lacks specialised approaches that would favour analysis. In the interviews, this type of focus is also evident in the pieces finally produced and broadcasted, mainly police pieces, linked to the prosecution of crime or the capture of a network by the National Police or the Spanish Civil Guard (E4, E3). Even within this police/judicial perspective, the news focus more on organised crime, forgetting that trafficking "is not only about transnational organised crime but often also about individuals and informal groups" (E6).

On the other hand, both journalists and NGOs mention the need to use a "positive approach" when dealing with the phenomenon. In the discourse, expressions such as "recounting that it is possible to get out", "recovered" or "recovery process" are used because "it is necessary to recount the drama, but also to recount that it is possible to get out of the drama" (E4), and "stories of people who have been there and are coming out" (E1). This is because "if these women talk, it is because they are recovered and rescued" (E7), and "with the right time and specialised help they can move forward and can also empower themselves by talking about their recovery process, their process of integration into Spanish society, their progress and their achievements" (E6).

3.4. Relation between NGOs and the media

NGOs consider that their role with the media who want to address the issue involves several different scenarios. On the one hand, it is requested that when journalists contact specialised entities, they do not demand to be provided with direct testimonies of victims of trafficking (E6, E7). The fact that the victim has to recount and remember the situation she has lived does not help her recovery process and leads to a possible re-victimisation, "it has a very strong impact on them, sometimes a setback in their recovery process" (E6).

In order for this practice to become more and more minimal, NGOs demand that this situation be changed and that they position themselves as specialised sources from which the media requests information; in this way, "there can be a very nice, very creative, very empowering work between the specialised staff of organisations and journalists who want to deal with the subject" (E6). The fundamental role that NGOs are given is that of "mediation", obtaining positive experiences that "require very important, very detailed prior work, and what we do is very intensive mediation, being present at all times during the process (...)" (E6). Despite this context of improvement, specialised entities report very positive experiences of working with the media, establishing a relationship of mutual trust and collaboration (E6) to the point that "when we do any event, we don't even have to raise our hands or pick up the phone" (E7).

For their part, the media express their relationship with NGOs in positive terms and point out the need for collaboration, commitment, and trust in order to act on the basis of social journalism that is sensitive to this issue, and which should be promoted more frequently. In view of the above, it is fundamental to have as a clear objective that cooperation and collaboration must be very close between both sides in order to promote good journalistic practice in this area. Above all, it is important in the relationship between the victim and the media, where the NGOs place value on their "mediation in everything that has to do with the victim's safety, not to reveal her identity, respect her privacy and, of course, not allow her to be recognised visually" (E6). Furthermore, they indicate that, in the case of audio-visual media, the treatment and exposure to make the news visible requires a more complicated process. "(...) when we speak for example about the collaboration of women who have been trafficked in an audio-visual news item, collaboration is much more complex, because it involves greater intimidation, greater risk" (E6).

4. Discussion and conclusions

The first thing that stands out in the content analysis of the interviews with online newspaper professionals is the scarcity of information referring to human trafficking. This lack of visibility of the issue is due in part to the criteria of newsworthiness (Wolf, 1987), mainly accessibility, relying mainly on official sources, as already pointed out by other studies (Sanford et al., 2016). The criterion of relativity to human emotion or interest (Warren, 1975) also causes certain news to be disseminated and not others.

The media's lack of resources to report -and, above all, investigate- on human trafficking, together with the work overload in the newsrooms, results in a dependence on information from news agencies (Gelado-Marcos, 2009) and from the "communications offices of the State Security Forces and Corps and of the entities working in the field of prostitution and trafficking" (Fernández-Romero & Simón-Carrasco, 2019: 170), as corroborated by national (Saiz-Echezarreta et al., 2021) and international studies (Gregoriou, 2018; Krsmanovic, 2018). All of this "contributes to the agenda-setting effect and leads not only to the repetition of issues, but also to the reinforcement of stereotypes and the perpetuation of the thematic status quo" (Gelado-Marcos, 2009): 270). Victims as sources hardly feature at all, something the media criticises. The interviews revealed a certain dissatisfaction with the sources of information (State Security Forces and NGOs) on the part of some of the professionals interviewed because they showed little understanding of their needs when it came to preparing their work or because they did not facilitate contact with the victims. This dissatisfaction is also reflected by those NGOs who feel that some media do not adequately represent trafficking. This is why organisations working with victims and their recovery are reluctant to facilitate contact between victims and the media and when it is done, it is with established criteria, which are included in their guidelines (APRAMP, 2015) and with trusted media. This unease is also shown in some international studies (Krsmanovic, 2018). With regard to the focus of the news, human trafficking for sexual exploitation continues to dominate media coverage, which displaces or renders invisible other

forms of trafficking (Meneses, 2019; Ruiz et al., 2018; Sanford et al., 2016). One possible explanation is that sex trafficking is easier to cover in a news story because it provides a clear and simple violation of the law, whereas labour trafficking cases are more complex and often involve civil rather than law enforcement issues (Austin & Farrel, 2017).

Human trafficking is seen as a problem of prostitution, migration or human trafficking, and the media neglect to delve into the heart of the problem (Papadouka et al., 2016) and sometimes, the lack of clear distinction regarding the term "trafficking" makes the media combine the phenomenon with other issues such as human trafficking, prostitution or slavery (Sanford et al., 2016), "it is not about prostitutes, it is about women forced into prostitution, into sexual slavery" (Comunidad de Madrid, 2015): 48).

The previous over-reliance on official sources, mainly State Security Forces (police and, to a lesser extent, judicial), means that the problem is treated as an event (Fernández-Romero & Simón-Carrasco, 2019; Comunidad de Madrid, 2015). The news reports show police raids or the dismantling of networks for trafficking and smuggling women for sexual exploitation, addressing the specific event, "exaggeratedly prioritising the criminological, police and judicial approach, and those associated with rescue and re-victimisation" (Saiz-Echezarreta et al., 2021): 163), detached from the causes and context that give rise to it, as a social problem. The fact of including trafficking in society and events sections shows how the media conceive human trafficking as a problem of security, law and order, and not as a problem of human rights violations (Howard & Lalani 2008), with a core focus on human rights (Comunidad de Madrid, 2015), as well as being an indicative pattern of the depoliticization of this problem (Madueño-Hidalgo & Sierra-Rodríguez, 2019). However, it is not only in the press that the narratives and common places inscribed in news stories are applied, but also in communication campaigns (Saiz-Echezarreta et al., 2018: 36).

It is important not only to change the focus, broadening the information beyond police and/or judicial actions (Save the Children, 2013), but to contextualise the problem as well. Contextualisation allows for deeper levels of information, providing the reader with as many elements as possible that contribute to the understanding of the messages conveyed (Verga & Micelli, 1994), showing other intrinsic aspects of human trafficking, such as the feminisation of poverty, structural inequalities and the scarce fulfilment of human rights (Madueño-Hidalgo & Sierra-Rodríguez, 2019).

In conclusion, and according to the research questions posed, the media portrayal of trafficking of human beings is biased, with most of the news focusing on sexual exploitation. In addition, the inadequate resources available to the media, the lack of specialised training, and the work overload of journalists make it impossible to adequately cover the news on trafficking.

The scarcity of resources, the need to obtain information quickly, the journalist's training, accessibility, etc., are elements that lead to an excessive use of institutional sources, which, in this case, are those derived from the State Security Forces and Corps. Despite the above, progress has been made, including coordination and collaboration with specialised entities, as well as the effort to broaden the approach to the issue in relation to the victims and to distinguish the concepts of prostitution and trafficking separately, but also linked to sexual exploitation.

In short, it is essential to delve deeper and expand the focus of this complex reality in order to approach the phenomenon from multiple perspectives: economic, showing the very high profits obtained from this illegal business; legal, with the protection of victims; political, showing the support measures for victims and the mechanisms to fight against traffickers; the social perspective of denouncing the violation of human rights; and the gender perspective. All of this without forgetting the victims, to give them a voice, with quality journalistic practices and with joint work between NGOs and the media that not only improves the treatment of news on human trafficking in accordance with the existing recommendations of specialised entities, but also strengthens and reinforces a firm commitment to coordination and collaboration between both sides, with the aim of making visible all forms of trafficking that occur in our country and that remain hidden.

Authors' Contribution

Idea, E.C., P.A; Literature review (state of the art), E.C.; Methodology, P.A.; Data analysis, E.C., P.A.; Results, E.C., P.A; Discussion and conclusions, E.C., P.A.; Writing (original draft), E.C.; Final revisions, E.C., P.A.; Project design and sponsorship, P.A.

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Emoticons in student-professor email communication

Emoticonos en la comunicación por correo electrónico entre estudiantes y profesores

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ABSTRACT

Emoticons have become a common phenomenon in email correspondence between students and professors. Even though the use of emoticons in formal writing is considered inappropriate and unprofessional, more and more students are using these nonverbal communication tools to add context or emphasis to their email messages to professors. This paper examines the association between the use of emoticons and professors' perceptions of higher education students' email messages with and without emoticons in two countries, Serbia and Slovenia. The students' emails were collected and assessed on several levels. The students' messages were examined with particular attention to the appropriateness of the students' writing style. In addition, the students' level of digital literacy, their attitude toward a professor, and gender differences in the use of emoticons were examined. Furthermore, an online questionnaire was used to identify characteristic differences between students who use emoticons and students who do not. The results show that messages with emoticons are rated lower on several dimensions than messages without emoticons. In addition, students who use emoticons show lower digital literacy and perceive their professors as more understanding and helpful. Emoticon use is not related to gender. The results suggest that students should avoid using emoticons even if they have a positive attitude toward their professor.

RESUMEN

Los emoticonos se han convertido en un fenómeno común en la correspondencia por correo electrónico entre estudiantes y profesores. Para los estudiantes, estas herramientas de comunicación no verbal son una forma de agregar contexto o énfasis a sus mensajes. Sin embargo, para la mayoría de los profesores, el uso de emoticonos se considera inapropiado y poco profesional. A medida que más estudiantes incorporan emoticonos en sus mensajes de correo electrónico a los profesores, nos propusimos examinar la relación entre el uso de emoticonos y las percepciones de los profesores sobre los mensajes de correo electrónico de los estudiantes con y sin emoticonos. Examinamos los mensajes de los estudiantes con particular referencia a la adecuación del estilo de escritura de los estudiantes, evaluamos el nivel de alfabetización digital de los estudiantes, su actitud hacia un profesor y las diferencias de género en el uso de emoticonos. Recopilamos correos electrónicos de los estudiantes y los calificamos en varias dimensiones. Además, utilizamos un cuestionario en línea para identificar las diferencias características entre los estudiantes que usan emoticonos y los que no. Los resultados muestran que los mensajes con emoticonos tienen una calificación más baja que los mensajes sin emoticonos en varias dimensiones. Los estudiantes que usan emoticonos también muestran una menor alfabetización digital y perciben a sus profesores como más comprensivos y serviciales. Contrariamente a nuestras expectativas, el uso de emoticonos no está relacionado con el género. Los resultados sugieren que los estudiantes deben evitar el uso de emoticonos, puesto que el profesor espera un comportamiento apropiado a través de Internet.

KEYWORDS | PALABRAS CLAVE

Communication skills, communication, digital communication, emoticons, gender, email.
Habilidades de comunicación, comunicación, comunicación digital, emoticonos, género, correo electrónico.

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1. Introduction

Over the past decade, as Internet use and digital communication environments have evolved, the use of emoticons has become common and has begun to play an important supplementary role in various types of text-based online communication (Stanton, 2014). This type of ubiquitous nonverbal communication tool (Lu et al., 2016) has been used more recently among young people, who have quickly incorporated emoticons into their everyday communication habits. Emoticons help young people, especially Millennials and GenZ, master the communication climate and construct and express their aesthetic selves (Sugiyama, 2015). Tang and Hew (2018) state that emoticons help individuals to express their emotions and maintain relationships, but also serve as words to facilitate understanding of the message. Since emoticons speak a universal language, young people feel that they can express their thoughts and feelings without words, which reduces the time they need to type words and sentences (Abdullahi, 2021). Moreover, they see emoticons as an integral part of communication and find messages without emoticons dry, emotionless, and too serious (Kaye et al., 2016).

As Dresner and Herring (2010) explain, emoticons (short for "emoticon icons") refer to graphic signs, such as the smiley face, that often accompany computer-mediated communication (CMC). Meier and Reinecke (2020) identify CMC as an inclusive umbrella term for multimodal human-to-human social interaction mediated by information and communication technologies (ICTs), which compared to face-to-face communication provides more room for emoticons to exist (Anuar et al., 2009). Furthermore, according to Rust and Huang (2021), emoticons are typographical tricks that resemble pictures, whereas emojis are plug-in graphics that are actual pictures. In this research, both are considered using the common phrase emoticons.

There is currently a great deal of interest in linguistics and communication studies (Logi & Zappavigna, 2021) in the role that non-linguistic features such as emojis play in digitally mediated communication. Emoticons are widely used in social media discourse to express emotions, convey attitudes, and negotiate interpersonal relationships. Researchers have examined a wide range of issues related to the use of emoticons in the context of CMC, focusing on their role in online communication (Hamid, 2018; Jibril & Abdullah, 2013; Thompson & Filik, 2016) and the impact they have on that communication (Derks et al., 2008a; Skovholt et al., 2014; Walther & D'Addario, 2001). Most studies define the role of emoticons in two ways: first, as a substitute for nonverbal cues that are absent in CMC compared to face-to-face communication (Lo, 2008; Walther & D'Addario, 2001); and second, as a reinforcement of the intent of a particular statement (Avery, 2017; Crombie, 2020). Some studies report that emoticons are not only signals for emotional information, but are also used for communicative purposes, for example, to communicate social motives (Derks et al., 2008a).

With the increasing popularity and widespread use of emoticons by young adults in their daily communications, it has also become widely common for them to send emails with emoticons to their university professors. Although people can overcome the limitations of email by using emoticons to convey the emotional meaning of their message, research has shown that emoticons are not consistently interpreted and can appear informal in business emails and even harm the credibility of the sender (Bartl, 2017). It seems clear that many students do not adhere to the conventions of professional email writing and the rules of email etiquette in their emails. On the contrary, they approach email similarly to informal text messaging and other forms of digital communication where the typical conventions are informality and brevity (Corrigan & Hunt-McNabb, 2015). In recent years many studies have been conducted on emoticon use and gender, showing either that emoticon use has nothing to do with gender (Thompson & Filik, 2016; Walther & D'Addario, 2001) or that women are more likely to use emoticons than men (Butterworth et al., 2019; Haji & Bakir, 2019; Oleszkiewicz et al., 2017; Shah & Tewari, 2021; Wolf, 2000). This research study aims to investigate the use of emoticons and different aspects of email messages received by students, and how the assessment of students' messages differs when they add nonverbal cues to their emails. In this context, the questions are how professors' assessment of students' email messages, students' assessment of digital literacy, and students' attitudes toward the professor differ when a message includes an emoticon, and whether there are differences in emoticon use between male and female students.

1.1. Literature review

Although the use of emoticons has been extensively researched, much less is known about the recipients' perceptions and evaluations when viewing and comparing students' messages with or without emoticons. In their study on the effects of emoticons on online message interpretation, Derks et al. (2008a) conclude that emoticons do have some influence on message interpretation and that they may serve some of the same functions as actual nonverbal behaviours. In contrast, Walther and D'Addario (2001) argue that emoticons have less influence on message interpretation than expected. They claim that, at best, emoticons can have the function of complementing verbal messages, but they do not contradict or reinforce them.

The following subsections first present research done on the assessment of students' email messages and email writing style, which serve as the basis for email evaluation in this research. This is followed by a description of research on the two main constructs that we hypothesise to be associated with emoticon use, namely digital literacy, and attitude towards the professor. In addition, an overview of research on differences in emoticon use in relation to gender is provided.

1.1.1. Assessment of students' email messages

Various studies have discussed and evaluated different aspects of email communication. For example, to determine the relationship between three aspects of email communication, Economidou-Kogetsidis (2018) analysed and coded emails received by students based on salutation, degree of imposition, and degree of directness. Danielewicz-Betz (2013) used 13 qualitative coding categories to assess email appropriateness and domain congruence, while Huang (2016) assessed emails using coding categories on written and oral communication from their previous studies. For the purposes of our study, and as shown below, several items (elements) were included in the assessment of students' email messages.

1.1.2. Email writing style

Studies on the use of emoticons in social media abound (Barach et al., 2020; Hamid, 2018; Kaye et al., 2016; Shah & Tewari, 2021). However, it is important to point out that there is a big difference between the culture of social media, where a more casual and figurative writing style is used, and the more professional writing culture of academic discourse, which is the focus of this present study. According to Economidou-Kogetsidis (2018), professional emails follow an epistolary format similar to that of a business letter, with a greeting, body and salutation. However, Economidou-Kogetsidis (2018) found that despite some characteristics of business letter writing, students treated their emails to professors as "formal text messages". While Anuar et al. (2009) argue that email users who embed emoticons in their messages place less emphasis on grammar, punctuation, and spelling, Haji and Bakir (2019) point out that students frequently and indiscriminately use emoticons in their messages to professors without knowing the exact linguistic position for using a particular emoticon. The authors also emphasise that this type of communication is not appropriate from a pragmatic point of view and can lead to misunderstanding and miscommunication. Another aspect is that email senders use emoticons to compensate for the absence of nonverbal behaviours and social context cues (Dunlap et al., 2016) or the lack of vocabulary (Bogdanović & Bulatović, 2020). In this sense, emoticons are used as shortcuts that help email users convey the message more easily and express the level and direction of emotions, attitudes, and attention more effectively (Lo, 2008).

1.1.3. Digital literacy

Digital literacy, sometimes referred to as information literacy, describes the knowledge and skills a person needs to navigate a media and information-rich environment (Sorgo et al., 2017). According to Ng (2012), digital literacy has three dimensions: technical, cognitive, and social-emotional. The social-emotional dimension is defined as understanding the conversational content and tone of writing, including text abbreviations and emoticons (Ng, 2012). Dunlap et al. (2016) consider the use of emoticons as an effective use of electronically mediated communication and a specific skill that is an aspect of digital literacy. As Shao and Purpur (2016) state, information literacy is correlated to students' writing skills.

1.1.4. Attitude to professor

Students who have grown up in the instant messaging culture are often unaware or unsure of the politeness conventions and email etiquette when communicating with a professor (Biesenbach-Lucas, 2007; Chen, 2006). They often tend to become overly friendly with academic staff, thinking of them as friends rather than representatives of authority, and do not think of adapting their email style to the academia (Danielewicz-Betz, 2013). According to Economidou-Kogetsidis (2018), it is necessary to consider the variable of familiarity between the student and the professor in relation to the degree of formality of email communication, especially since students' conversational writing style and inappropriate email etiquette may negatively affect their professors' perception of them (Bolkan & Holmgren, 2012; Kim et al., 2016). In their study on the use of emoticons among university students, Haji and Bakir (2019) confirm that the use of emoticons influences the way other people judge your personality.

1.1.5. Gender

Many research studies have examined the use of emoticons between genders, finding that gender and emoticon choice influence message perception (Butterworth et al., 2019; Danielewicz-Betz, 2013; Shah & Tewari, 2021; Wolf, 2000). In a pragmatic study on the use of emoticons among university students, Haji & Bakir (2019) found that women use emoticons more often than men. They attribute this to the fact that females are more sociable than males. Other studies, however, have provided no link between emoticon use and gender (Thompson & Filik, 2016; Walther & D'Addario, 2001). In addition, Butterworth et al. (2019) suggest that a text message containing affectionate emoji will be perceived as more appropriate and sympathetic if it comes from a female sender than from a male sender.

2. Methodology

Following an overview on the research studies, the following chapters provide more detail on the theoretical background and research hypotheses, the data collection procedure, statistical methods, and sample characteristics.

2.1. Theoretical framework and research hypotheses

Students tend to send email messages to professors in a variety of forms and writing styles. The use of digital language with emoticons and certain phrases in special applications such as WhatsApp is widespread, and according to Escobar-Mamani and Gómez-Arteta (2020), using digital language makes students feel closer to their teacher. Many students address professors by their first name; they often use abbreviations, informal language, or even slang; they do not identify themselves; they do not pay attention to grammatical accuracy, etc. Several authors have discussed how a proper formal email sent from a student to a professor should be formatted and styled. The subject line should be informative and relevant (Kim et al., 2016) and the salutation should be formal, using the title (Bjørge, 2007; Chejnová, 2014; Chen, 2006; Hallajian & Khemlani, 2014), the student should identify themselves, and use a proper sign-off (Chen, 2006). The email should include a proper closing (Chen, 2006; Kim et al., 2016; Lam, 2014; Waldvogel, 2007) and layout (Lam, 2014), achieving an appropriate level of formality and politeness (Chen, 2006). Since some emails contain emoticons while others do not (Chen, 2006; Lam, 2014), our first goal as researchers was to find out if students who use emoticons generally write less formal and professional emails. The following hypothesis was therefore formulated:

- H1: Students who use emoticons score lower on the elements of an email message than students who do not use emoticons.

Emails were assessed based on eight criteria presented in Table 1. Each element was analysed individually and a total score on all subscales, excluding the use of emoticons, was also calculated. A higher score within each subscale always indicates a more appropriate email considering the guidelines for professional or academic emails (Biesenbach-Lucas, 2007; Filippone & Survinski, 2016; Kim et al., 2016). The assessment items with the corresponding subscales are presented in Table 1. In addition, each email was classified into at least one of the following categories: request, complaint, technical issue, apology, thank-you note, and giving information.

Table 1. Assessment elements of students' email messages		
ID	**Assessment item**	**Scale**
ASE1	Subject line	0 – none, 1 – irrelevant, 2 – relevant, not informative, 3 – relevant, clear and concise
ASE2	Salutation	0 – none, 1 – informal, 2 – formal, 3 – formal with title
ASE3	Self-identification	0 – none, 1 – incomplete, 2 – complete
ASE4	Closing	0 – none, 1 – informal, 2 – formal
ASE5	Sign-off	0 – none, 1 – name, 2 – name and surname
ASE6	Layout	0 – none, 1 – some linespacing and paragraphing, 2 – proper layout
ASE7	Formality	0 – familiar, chatty, 1 – neutral, 2 – polite
ASE8	Politeness	0 – impolite, 1 – neutral, 2 - polite

Although email platforms have been identified as less suitable for emoticon use (Kaye et al., 2016), emoticons are commonly used in all forms of CMC today (Manganari, 2021). There seems to be a strong relationship between CMC and digital literacy. The use of emoticons is perceived as a digital competency (Dunlap et al., 2016) or the social-emotional dimension of digital literacy (Ng, 2012). In this study, digital literacy was measured using several items derived from Ng (2012) and Prior et al. (2016). Students were asked if they keep up with new technologies, if they learn to use new technology easily, if they have good ICT skills, and if they are aware of issues related to web-based activities such as cybersecurity. The above observations formed the basis for the following research hypothesis:

- H2: Students who use emoticons have a lower level of digital literacy skills than students who do not use emoticons.

Students are usually not adequately qualified as professional email writers (Kim et al., 2016). While digital language with emoticons is mainly used in applications such as WhatsApp (Escobar-Mamani & Gómez-Arteta (2020), there are differing opinions on the extent to which students are aware of the role their email messages play in their relationship with faculty. Avery (2017) noted that students are aware of the potential disapproval of emoticons, while Danielewicz-Betz (2013) argues that students are unaware of these consequences. Nevertheless, according to Bolkan & Holmgren (2012), the use of politeness strategies does influence the professor's affect toward students. There are still only a few studies that address the reasons why students use emoticons in academic discourse (Avery, 2017; Haji & Bakir, 2019). Seven items derived from Wilson et al. (2010) were used to assess students' attitudes towards their professor: respect for the teacher, how they get along with the teacher, whether they perceive the teacher as understanding, friendly, and approachable, whether the teacher is eager to help students, and whether they feel comfortable telling the professor that they need help. It is hypothesized that students tend to use emoticons when they feel comfortable with the professor in question. The following hypothesis was formulated to determine a possible correlation between students' attitudes towards the professor and their use of emoticons in their emails.

- H3: Students who use emoticons have a more positive attitude towards their professor than students who do not use emoticons.

Different authors provide conflicting evidence on the use of emoticon and gender. While some researchers show that there are no differences in the perception (Anuar et al., 2009) and emoticon use (Jones et al., 2020; Rodrigues et al., 2018; Thompson & Filik, 2016), others show that women use emoticons more frequently than men (Butterworth et al., 2019; Haji & Bakir, 2019; Oleszkiewicz et al., 2017; Shah & Tewari, 2021; Wolf, 2000). Although exploring the influence of gender was not the primary focus of this study, the researchers of the present study sought to explore whether there were differences based on different results of previous studies. Therefore, the following hypothesis was formulated:

- H4: There is an association between gender and use of emoticons.

The four hypotheses presented were formulated to gain insight into the use of emoticons in student-professor email communication. Level of formality, digital literacy, attitude toward the professor, and gender differences in emoticon use were examined according to the methodology described in the following section.

2.2. Study instrument and data collection

The data (Baggia, 2022) were collected in two stages, as part of a larger study of email communication between students and professors (Tratnik et al., 2021). Ethics committee approval was obtained prior to

the data collection phase during the 2018/19 and 2019/20 academic years. The sample and data sources for the study came from two higher education institutions, namely the Faculty of Organizational Sciences in Slovenia and the Faculty of Technical Sciences in Serbia. In both countries, 15 teacher researchers ranging from teaching assistants to full professors (ten from Serbia and five from Slovenia) of different subjects from the fields of mathematics, foreign languages (English), and management of information systems created a database of email messages from students. All messages were already assigned a unique code during the collection phase and anonymized before analysis. For the purposes of this study, only emails with emoticons were used and added to the email corpus. The professor rated the student's email received using an online assessment form. The student received an invitation email to participate in the study, which included a unique code, a consent form, and a guarantee that the survey was anonymous and completely voluntary. The student was instructed to complete an online questionnaire.

After the data collection phase, data from student responses were merged with student emails analysed by professors. The students received no incentives for participating in the study.

2.3. Statistical methods

The validity of a questionnaire was assessed by examining the construct validity of each scale (construct), which was examined through evaluation of convergent validity and discriminant validity. Exploratory Factor Analysis (EFA) was used first, followed by a Confirmatory Factor Analysis (CFA). The EFA was conducted using IBM SPSS Statistics for Windows, Version 28.0, while CFA was performed using the R-package lavaan (Rosseel, 2021). The summary of the results is as follows.

The EFA, using Principal Axis Factoring (PAF) and an oblique rotation (Direct Oblimin), which assumes that factors are correlated, was performed on 11 items. The results revealed two factors aligned with the research considered in the development of the questionnaire. The Kaiser–Meyer–Olkin (KMO) test indicates that is appropriate for factor analysis (KMO=0.849), while Bartlett's test of sphericity shows that the correlation matrix among variables is not an identity matrix ($p<0.001$). The obtained two factors explain 65.7% of variance.

The correlation coefficient between the factors obtained by the oblique rotation was 0.111, indicating that the factors are not correlated, so the Varimax rotation was applied in the second step. The first factor includes four variables measuring Digital literacy (all factor loadings were higher than 0.682), while the second factor includes seven items measuring Attitude to Professor (all factor loadings were higher than 0.489), as assumed based on the literature review when designing the questionnaire.

The construct validity of both constructs was assessed by CFA. It was examined through evaluation of convergent validity and discriminant validity. In the first step, the item "I don't feel uncomfortable letting my professor know I need help" was removed from the construct because the standardized factor loading was below 0.5 (0.484). In the second step, the CFA was performed on 10 items and convergent validity was confirmed (Koufteros, 1999) by evaluating three criteria: (a) estimates of standardized factor loadings exceed 0.5 for all ten items on both constructs (eight items reach a stricter criterion of standardized factor loadings above 0.7), (b) Composite Reliability (CR) for each construct exceeds 0.7 (CR=0.834 and CR=0.919 for Digital Literacy and Attitude to Professor, respectively), and (c) the Average Variance Extracted (AVE) for each construct exceeds 0.5 (0.563 for Digital Literacy and 0.655 for Attitude to Professor).

The discriminant validity was examined by comparing the square root of AVE of each construct with the correlations between the two constructs, which is very low (r=0.097), indicating that the two constructs are not correlated. Reliability was assessed by calculating a Cronbach alpha coefficient for both constructs included in the questionnaire. Both calculated coefficients, for Digital Literacy (α=0.826) and Attitude to Professor (α=0.890), indicate high reliability.

The results show that both scales are acceptable in terms of internal consistency, convergent validity, and discriminant validity. To test the four research hypotheses, a t-test for independent samples and chi-square test were used. The research hypotheses tested in this study were confirmed or rejected at a 5% significance level.

2.4. Sample characteristics

A purposive sample was used, where students were invited to participate in the online survey after sending an email to their professor. The analyses included 307 evaluated emails and 214 students who completed at least a portion of the survey. 53.7% (165) of the emails were sent by women, while 46.3% (142) were from men.

Most of the emails were in Slovenian (81.4%, 250), while 8.6% (57) were in English. More than half of the respondents (52.8%, 162) were at the first Bologna professional level, 21.1% (68) at the first Bologna academic level, a quarter (24.8%, 76) at the second Bologna level (Master) and one student (0.3%) at the third Bologna level (PhD). Among women, 7% used emoticons in their emails, compared to 6% among men.

The survey was anonymous and voluntary; students received no reward for participating in the survey. The age of the respondents ranged from 18 to 54, with an average age of 27.5 years and a standard deviation of 8.65 years. The grade point average was 8.19 with a standard deviation of 0.969.

3. Results

The corpus of email messages analysed in this study was quite diverse. From almost formal emails containing emoticons only to clarify the meaning of the message, to purely informal examples with a variety of emoticons with no clear meaning. Figure 1 shows an example of an email from a student to a foreign language professor.

Figure 1. Example of a student's email message with an emoticon

To: "
From:
Date: 10/25/2018 09:00AM
Subject: Forum reflection

Hello!

When you asked for someone to volunteer for forum moderator I was scared because I'm scared to talk or write in English in front of other students but then I summon the courage and I don't regret it.
For me it was challenging, for example that other students wouldn't mock me for writing something but they response and make an interesting conversation because they look from another prospective.
I learned how to collect thoughts and ask them to think in other prospective and hope they will replay 🙂
At the beginning i didn't know exactly if I write enough or should I replay on more comments. I also didn't know if I extended the topic too much or maybe too little. But then I just follow my instinct and I think it turn out pretty good.
Maybe I would just like for students to replay not just once but when the topic go on to give another opinion.
To sum up I enjoyed being forum moderator and learned a lot. I hope you like the way I extended the topic and how much I replayed.
Have a nice day!

Goodbye.

In order to examine differences in the professor's assessment of the email, students' level of digital literacy, attitudes toward the professor regarding the use of emoticons in email messages, and the relationship between emoticon use and gender, four hypotheses were proposed. The hypotheses were tested using the methodology presented.

3.1. Classification and the assessment of emails

The mails were classified into at least one of six categories based on their content: "Request", "Complaint", "Technical issue", "Apology", "Thank you letter", and "Giving information". The results are presented in Table 2.

Out of 307 emails received and evaluated, only 20 (6.5%) contained emoticons. The majority of emails with emoticons were classified as request (75%), with the remainder classified as either apology or thank you (15% each). Compared to the emails without emoticons, lower percentages were classified as apologies or thank you letters, 7% and 3% respectively.

Table 2. The purpose of email and use of emoticons				
Purpose of email	**Use of emoticons**			
	Yes		**No**	
	F	**%**	**f**	**%**
Request (e.g., appointment, feedback, mentorship, extension of due date, asking for information, questions on obligations).	15	75%	232	81%
Complaint (e.g., concerning exam results, assignment grade).	0	0%	3	1%
Technical issues (e.g., Moodle, email, digital identity).	1	5%	22	8%
Apology (e.g., late submission, absence).	3	15%	19	7%
Thank you letter (e.g., quick response, valuable information).	3	15%	8	3%
Giving information (e.g., sending homework, report).	11	55%	153	53%

Analysis of the use of emoticons in students' email messages (Table 3) shows that emoticons were used either as an actual image (4 times) or as a combination of different punctuation marks designed to show different emotional facial expressions (18 times). Almost 70% (15 out of 22) of the emoticons depict a happy face while other messages also have some special features like smiling eyes, tongue sticking out, winking, etc. Only one emoticon represents a negative feeling, more precisely sceptical or undecided. The emails with emoticons can be classified mainly as requests and/or informational messages. There were no emoticons in the emails classified as complaints, while two apology emails also had emoticons.

Table 3. Type and frequency of emoticons used		
Emoticon	**Description**	**Frequency**
	Squinting face with tongue	1
	Grinning face with smiling eyes	1
	Smiling face with smiling eyes	2
☺	Happy face	1
:P	Tongue sticking out; cheeky/playful	1
:-)	Happy	1
;)	Wink	1
:/	Sceptical, annoyed, undecided, uneasy, hesitant	1
:)	Happy	13

The students' writing style was assessed based on the sum of the eight elements ASE1-ASE8, shown in Table 1. The email with the lowest score received 2 points, while five emails received the highest score of 18 points. The mean score was 14.27 with a standard deviation of 2.94.

3.2. Comparison of emails according to the (non)use of emoticons

Consistent with the proposed hypothesis (H1), the researchers of this study examined whether emails with and without emoticon were evaluated differently. The results are summarized in Table 4. Students who use emoticons score lower on average on the salutation subscale (1.30) than students who do not use emoticons (1.83) t=-4.020 p(1-sided)=0.000. Identifying the mail sender is an important element of any email. In this regard, students who use emoticons receive, on average, a lower score on the self-identification subscale (1.25) than students who do not use emoticons (1.73) (t=-2.491 p(1-sided)=0.011). Students who use emoticons receive, on average, a lower grade on the sign-off subscale (1.25) than students who do not use emoticons (1.70) (t=-2.307, p(1-sided)=0.016). Students who use emoticons have, on average, a lower level of formality (0.95) than students who do not use emoticons (1.75) (t=-6.846, p(1-sided)=0.000). Four elements are not rated lower for students who use emoticons in their emails: subject line (p(1-sided)=0.148), closings (p(1-sided)=0.467), layout (p(1-sided) = 0.085), and level of politeness (p(1-sided)=0.195).

In the overall assessment of emails (sum of scores for ASE1 to ASE8), students who use emoticons have, on average, a lower overall grade (11.65) than students who do not use emoticons (14.46) (t=-4.247, p(1-sided)=0.000). In accordance with the results presented, the first research hypothesis can be confirmed: Students who use emoticons score lower on the elements of an email message than students who do not use emoticons.

Table 4. Results of t-tests for the elements of students' email messages according to the use of emoticons									
Elements	Scale	Use of emoticons		Levene's test for equality of variances		t-test of equality of means			
		Yes (N=20)	No (N=285)						
		Mean (SD)	Mean (SD)	F	p	t	df	p (2-sided)	p (1-sided)
ASE1: Subject line	0-3	2.10 (1.021)	2.30 (0.811)	1.924	0.166	-1.045	305	0.297	0.148
ASE2: Greetings or salutation	0-3	1.30 (0.571)	1.83 (0.569)	1.176	0.279	-4.020	305	0.000	0.000
ASE3: Self-identification	0-2	1.25 (0.851)	1.73 (0.586)	12.198	0.001	-2.491	20.30	0.021	0.011
ASE4: Closings	0-2	1.55 (0.759)	1.56 (0.754)	0.000	0.989	-0.083	305	0.934	0.467
ASE5: Sign-off	0-2	1.25 (0.851)	1.70 (0.616)	9.324	0.002	-2.307	20.41	0.032	0.016
ASE6: Layout	0-2	1.50 (0.761)	1.75 (0.530)	9.576	0.002	-1.420	20.31	0.171	0.085
ASE7: Level of formality	0-2	0.95 (0.686)	1.75 (0.493)	1.448	0.230	-6.846	305	0.000	0.000
ASE8: Level of politeness	0-2	1.75 (0.444)	1.83 (0.395)	2.058	0.152	-0.861	305	0.390	0.195
Total sum	0-18	11.65 (3.453)	14.46 (2.813)	0.796	0.373	-4.247	305	0.000	0.000

3.3. Digital literacy and the use of emoticons

A new variable, Digital Literacy, was calculated as a mean value of four statements, measuring digital literacy skills (Table 5). The mean value of Digital Literacy for students who use emoticons is equal to 3.45, while mean value for students who do not use emoticons is 3.84 (Table 5).

Students who use emoticons have, on average, lower levels of digital literacy than students who do not use emoticons, at a 5 % significance level (p(1-sided)=0.013). Therefore, the second research hypothesis that students who use emoticons have, on average, a lower level of digital literacy can be confirmed.

Four statements within the Digital Literacy construct (Table 6) were evaluated to determine which group of students using emoticons has lower skills. Students who use emoticons have, on average, lower digital literacy skills than those who don't use emoticons for three items: ability to learn new technology (p(1-sided)=0.005), good ICT skills (p(1-sided)=0.044), and familiarity with issues related to web-based activities (p(1-sided)=0.017). For three of the four items on Digital Literacy, a statistically significant lower level of digital literacy was confirmed among students using emoticons, compared to those not using them.

3.4. Attitude to professor and the use of emoticons

A new variable, Attitude towards the Professor, was calculated as a mean value of six statements (Table 5) that make up the corresponding construct. The mean of the Attitude towards the Professor variable is 4.84 for students who use emoticons, while the mean for students who do not use emoticons is 4.63 (Table 5).

Students who use emoticons, on average, have a more positive attitude towards the professor than students who do not use emoticons, at a 5% significance level (p(1-sided)=0.013). Therefore, the third research hypothesis that students who use emoticons have a more positive attitude towards the professor can be confirmed. The construct Attitude towards the Professor consists of six statements, and the study closely examined whether students who use emoticons have more positive attitudes towards all included aspects.

Table 5. Results of t-tests for constructs digital literacy and attitude towards the professor according to the emoticon use								
Elements	Use of emoticons		Levene's test for equality of variances		t-test of equality of means			
	Yes	No						
	Mean (SD)	Mean (SD)	F	p	t	df	p (2-sided)	p (1-sided)
Digital Literacy	3.45 (0.635)	3.84 (0.649)	0.158	0.691	-2.240	210	0.026	0.013
Attitude towards the Professor	4.84 (0.318)	4.63 (0.468)	9.843	0.002	2.427	18.97	0.025	0.013

There are statistically significant differences among students who use emoticons and those who do not on four measured/rated items (Table 6): getting along with the professor (p(1-sided)=0.000), the professor is understanding (p(1-sided)=0.007), the professor is approachable (p(1-sided)=0.037), and

the professor is helpful (p(1-sided)=0.021. Most of the items describing Attitude towards the Professor scored statistically significantly higher in the group of students using emoticons than in the group not using them.

Table 6. Results of t-tests for items of digital literacy and attitude towards the professor according to the emoticon use

Construct	Questionnaire item	Emoticons		Levene's test for equality of variances		t-test of equality of means			
		Yes	No						
		Mean (SD)	Mean (SD)	F	p	t	df	p (2-sided)	p (1-sided)
Digital literacy	I keep up with important new technologies.	3.60 (0.737)	3.82 (0.837)	0.035	0.851	-0.976	210	0.330	0.165
	I can learn new technology easily.	3.47 (0.640)	3.96 (0.713)	0.223	0.637	-2.596	210	0.010	0.005
	I have good ICT skills.	3.13 (0.915)	3.55 (0.900)	0.158	0.692	-1.719	210	0.087	0.044
	I am familiar with issues related to web-based activities (e.g., cyber safety, search issues, plagiarism).	3.60 (0.910)	4.03 (0.742)	2.853	0.093	-2.131	210	0.034	0.017
Attitude towards the Professor	I respect my professor.	4.87 (0.352)	4.72 (0.485)	7.667	0.006	1.553	18.31	0.138	0.069
	I get along with my professor.	4.87 (0.352)	4.46 (0.643)	22.363	0.000	3.978	21.92	0.001	0.000
	My professor is understanding.	4.87 (0.352)	4.60 (0.568)	17.070	0.000	2.691	20.06	0.014	0.007
	My professor is friendly.	4.73 (0.458)	4.67 (0.523)	1.059	0.305	0.456	210	0.649	0.325
	My professor is approachable.	4.87 (0.352)	4.68 (0.539)	8.552	0.004	1.891	19.40	0.074	0.037
	My professor is eager to help students.	4.87 (0.352)	4.65 (0.575)	10.093	0.002	2.177	20.22	0.042	0.021

3.5. Association between gender and the use of emoticons

To test the association between gender and emotion use, a chi-square test was conducted. The results of the chi-square test ($\chi 2=0.337$, df=1, p=0.562) show that there is no association between gender and the use of emoticons. Therefore, the fourth research hypothesis about the association between gender and the use of emoticons cannot be confirmed.

4. Discussion and conclusions

While previous research has found effects of emoticon use on email perception and interpretation (Butterworth et al., 2019; Danielewicz-Betz, 2013; Shah & Tewari, 2021; Wolf, 2000), in this study the researchers aimed to empirically demonstrate the association between emoticon use and professors' assessment of students' email messages. Our study has shown that, contrary to students' opinions (Lo, 2008), professors' overall evaluations of emails with emoticons are lower than those of emails without emoticons. Specifically, students who use emoticons score lower on salutation, self-identification, sign-off, and level of formality. However, there are no differences when the subject line, closing, layout, and level of politeness are considered.

In discussing the elements that students use most inappropriately, the following observations can be made. First, the salutation is either too informal (e.g., "Hi" or "Hey" is used, either alone or along with the name), or students jump right into the message and do not address or identify the recipient at all. Second, students who embed emoticons in their messages do not identify themselves by name.

Figure 2. Example of an unprofessional student's email message

heeyy 'professor's first name', how are you ? I been in Belgrade till today and I will start soon to finish my work at english, can we talk tomorow on skayp ? thanks for answer
:) bayyy

The signature element is also missing. The tone of emails with emoticons is often too casual, with no paragraphs or line spacing. Some emails show excessive informality and a corresponding lack of

professional email etiquette, as seen in Figure 2.

Moreover, based on this study, it can be concluded that when emoticons are used, students' written language is generally very direct and casual and does not meet the standards of professional email communication. Considering that students need to be aware of the elements of usage when communicating with professors, it can be concluded and suggested that a short introductory course in netiquette should be offered to students to avoid these shortcomings. Danielewicz-Betz (2013) even argues that clear netiquette rules should be established for student-faculty interactions, with some consequences for students if they ignore the rules.

Another finding of our study, as shown in Table 3, is that students use a variety of emoticons, from winking, happy face, or smiling emoticons to cheeky, playful, smiling faces with smiling eyes, and grinning faces with smiling eyes emoji. The most common emoticon is the traditional smiley ":)". Similar to research by Crombie (2020), it can be confirmed that the most frequently used emoticons are mainly positive (happy, smiley emoticons). Only one negative emoticon is used, namely, a sceptical, indecisive face emoticon.

Moreover, this study indicates that students who include nonverbal cues in their communication with professors do so in different types of email messages. The results show that most emoticons accompany requests, thank-you notes, and emails in which students provide some type of information. Comparable results were obtained by Derks et al. (2008b), who report that more emoticons are used in a positive context than in a negative context. Surprisingly, there are no emoticons in complaints, confirming the college students' claims in the study by Algharabali and Taqi (2018), who believe that serious and/or sad messages should not contain emoticons.

Since digital literacy is an important aspect of CMC (Dunlap et al., 2016), the study investigated whether it is related to the use of emoticons in students' email communication. The hypothesis about lower levels of digital literacy among students who use emoticons in their email communication can be confirmed. From the results, it can be generalized that students who do not use emoticons in their emails to professors can learn new technologies more easily, are more familiar with issues related to web-based activities, and therefore are better able to judge where the use of emoticons is appropriate.

Next, it was hypothesized that the student's attitude towards the professor would influence the student's decision to use emoticons in his or her email communication (Danielewicz-Betz, 2013). The hypothesis about the differences in attitude toward the professor between two groups of students with and without the use of emoticons can be confirmed. Students who get along well with their professor, who believe that the professor is understanding, approachable and helpful, tend to use more emoticons. Moreover, students tend to use emoticons in their communication with professors to make the atmosphere friendlier and to lessen the seriousness of the message, as Haji and Bakir (2019) found.

Although some studies suggest that there is a gender difference in emoticon use (Haji & Bakir, 2019), no statistically significant association between the two variables was found in our study. This result supports a number of studies that find no gender difference in the use of emoticons (Thompson & Filik, 2016; Walther & D'Addario, 2001).

This paper contributes to research on the use of emoticons in computer-mediated communication and, in particular, in e-mail communication between students and professors. A major goal of the present study was to examine whether the assessment of email messages differs between emails with and without emoticons. The results indicate that, on average, students' emails with emoticons are rated lower than emails without emoticons.

The majority of emoticons identified in this research has a positive notation. Despite the fact that students tend to use emoticons when they perceive the professor positively, emoticons are not perceived positively by the professor because he/she expects student emails to follow a certain netiquette and reflect professionalism. It is reasonable to assume that students view email communication differently than professors and behave accordingly. For students, email is a form of informal communication similar to discourse used in social media, where emoticons are widely used. They do not recognize that emoticons are inappropriate in emails directed at professors. These different views between students and professors can also be explained by age. Students see the use of emoticons as a way to better express their thoughts and emotions, while professors consider their use unprofessional and inappropriate. These observations

were also confirmed by Raslie and Ting (2021), who say that GenZ like to use emoticons, gifs, and acronyms to communicate and negotiate interpersonal relationships, which can be challenging for the older generation.

There are several limitations in this study that could be considered in future research. First, the terms emoticons and emojis were equated due to the variety of technologies used in communication and message display. Namely, an emoji included in a message sent from a smartphone may be displayed as an emoticon on a desktop computer. Therefore, there is no basis for claiming that the same form of the encoded character was sent and received. In this context, it would be interesting to investigate from which device (cell phone or computer) an email came, which application was used, and whether there is a connection between the device, the application, and the emoticon used. Second, it would be useful to examine students' motives for adding emoticons to their messages and to consider the communicative functions of emoticons. Further research would also be worthwhile to determine the relationship between student age and emoticon use, how teachers understand emoticons, and whether perceptions of emoticons used by students are related to generational differences in teachers. Finally, given the obvious impact of the recent COVID-19 pandemic on our daily lives and the increased use of ICT, future research on the impact of these changes may expand the explanations for the use of emoticons in professional emails.

Authors' Contribution

Idea, A.T.; Literature review (state of the art), A.B., A.T.; Methodology, A.B., A.Z.; Data analysis, A.B., A.Z.; Results, A.B., A.T., A.Z.; Discussion and conclusions, A.B., A.T.; Writing (original draft), A.B., A.T., A.Z.; Final revisions, A.B., A.T., A.Z.; Project design and sponsorship, A.B., A.T., A.Z.

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