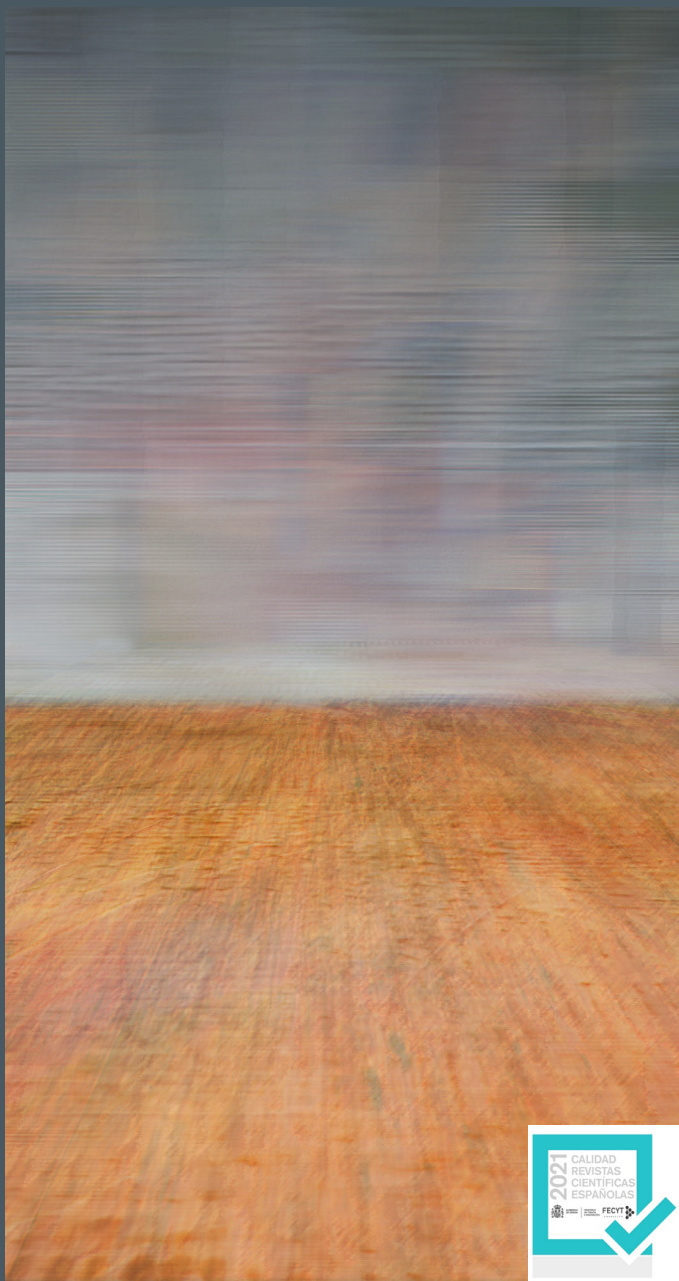


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Each year we publish four issues. Starting next issue (No. 361), the magazine will have three sections: Research, Essays and Education Experiences, all of them submitted to referees. In the first issue of the year there is also an index of bibliography, and in the second number a report with statistic information about the journal process of this period and the impact factors, as well as a list of our external advisors.

From 2006 to the second number of 2012 (May-August 358), *Revista de Educación* was published in a double format, paper and electronic. The paper edition included all the articles in the especial section, the abstracts of articles pertaining to the rest of sections, and an index of reviewed and received books. The electronic edition contains all articles and reviews of each issue, and it is available through this web page (www.mecd.gob.es/revista-de-educacion/), where it is possible to find more interesting information about the journal. From the 358 number *Revista de Educación* becomes exclusively an online publication.

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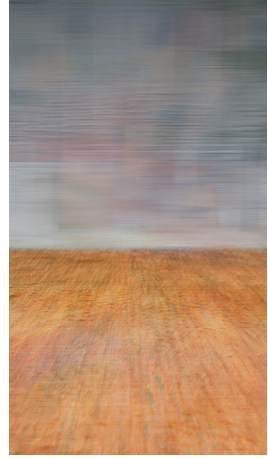
Monographic issue: Bullying and Internet risks: diagnosis, prevention and intervention

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Monographic section

Presentation: Bullying and Internet risks: diagnosis, prevention and intervention

Presentación: Acoso escolar y riesgos de Internet: diagnóstico, prevención e intervención

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Peer victimization is a very relevant educational, social, and health problem. In recent decades, the educational system and society have advanced in addressing and preventing these problems. However, we are still far from having safe centers where there is no discrimination for any reason. In this sense, it should be made explicit that all the problems in the educational field are important but bullying and cyberbullying are among the few that imply great suffering for those who endure them (and their families), and, in some cases, can even cost human lives. Thus, all the actors (educators, psychologists, health personnel, families, and those involved) must work together to prevent and intervene in bullying. In this situation, researchers must be a cornerstone in its resolution. Thanks to our work, the prevalence, incidence, and stability of bullying and the protection and vulnerability factors involved are known. Also, numerous prevention and intervention programs have been carried out with evidence of effectiveness.

In this sense, thanks to the Journal of Education, we, the guest editors, launched a monograph entitled “Bullying and Internet Risks: diagnosis, prevention, and intervention.” For this purpose, we launched an open call and invited research groups with an outstanding national trajectory. We are grateful for the number of manuscripts received (31) from Spain,

Italy, and various Latin American countries. The final acceptance rate was less than 25%, and we feel that many high-quality works were left out for space reasons. We appreciate the work of more than 40 reviewers from more than twenty universities who have supported the initiative and improved the published manuscripts through their excellent work. After this process, we selected seven manuscripts that we present herein and that we believe fully respond to the objectives we imposed on ourselves.

In the first place, and responding to the objective of the diagnosis, an article is presented that, through a very large sample (+10k students of Secondary Education), builds and validates a scale of self-perception and perception of bullying. It is necessary to provide the educational community with rigorously validated tools that, as in this case, allow knowing the students' perception of bullying. In addition, we wanted to highlight the joint actions within the framework of the Master Plan for coexistence and improvement of security in educational centers, as it is crucial to increase minors' and young people's trust in the State Security Forces and Corps.

Next are three systematic reviews (SR) of cyberbullying, the Internet relational risk with the highest presence in the manuscripts submitted. The first SR focuses on the relationship of cyberbullying with suicidal behavior, associating the two problems and highlighting the harmful nature of cyberbullying. The second SR emphasizes cyberbullying and different executive functions and their relationship with the roles of cybervictim or cyberbully. Finally, another SR on qualitative studies is presented, which highlights the role of the family and the parents' perception of the phenomenon of cyberbullying, which can be useful in prevention and intervention programs.

To conclude, the monograph is also fortunate to have several empirical studies that are unique concerning the nature of their design and the theme chosen. The first presents a longitudinal study (6 months) with students of Primary Education (much less studied than students of later stages). The data obtained show the relevance of social support and socio-emotional competences for the prevention of cybervictimization. The second one is a multilevel study that analyzes the effect of the group-class on cybervictimization in Secondary students, using an unusual level of analysis in the literature and of utmost importance for prevention and intervention strategies. Finally, and as a closing of the monograph, we present an investigation on another relevant relational risk of the

Internet: cyber dating abuse. It highlights the prevalence of this problem and its relationship with cyberbullying.

After all the above, we wished to collect articles in the monograph that address different areas, with varying levels of action and varied methodologies. We sincerely hope that this compendium will allow other researchers to update their knowledge and will humbly contribute to understanding a problem about which much remains to be done.

Finally, we want to thank all the authors for their participation and interest, the reviewers for kindly sharing their time to improve the quality of the works, and the editorial team of the *Revista de Educación* for their support, sensitivity, and scope in a topic as relevant as this. Hopefully, this monograph helps contribute to the emotional well-being and quality of life of our most important capital: our children and adolescents.

Design and validation of the Self-Perception and Perception of Bullying in Adolescents Scale (SPB-A)¹

Diseño y validación de la Escala de Autopercepción y Percepción del Acoso Escolar en Adolescentes (APAE-A)

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Abstract

This study constructs and validates the *Self-perception and Perception of Bullying in Adolescents Scale* to offer an instrument to assess bullying globally, also trying to make it quick and straightforward to complete. A total of 10,795 students of Compulsory Secondary Education with an average age of 13.94 years (51.1% girls and 48.9% boys) from public (54.4%) and state-subsidised (45.5%) schools in the Principality of Asturias (Spain) participated. The total sample was randomly divided into two halves for cross-validation with an Exploratory Factor Analysis (EFA) and a Confirmatory Factor Analysis (CFA) on the subsamples mentioned above. The results present a

¹ Work funded by the University of Oviedo through the PAPI-20-EMERG-20 Project.

scale with good reliability ($\alpha = .86$) and composed of 27 items and 4 factors: Behaviours involving bullying (F1), Bullying behaviours witnessed (F2), Bullying behaviours experienced (F3), and Reaction to bullying behaviours (F4). The scale obtained is invariant according to the type of school, gender, and year. The brevity, simplicity, and reliability of this scale indicate that it may be of interest both at a research or diagnostic level and, later, in professional practice and socio-psycho-educational intervention from an eminently preventive or coping approach to bullying during adolescence.

Keywords: bullying, Secondary Education, school violence, coexistence, validation of instruments.

Resumen

Este estudio construye y valida la *Escala de Auto percepción y Percepción del Acoso Escolar en Adolescentes* con el objetivo de ofrecer un instrumento para evaluar de manera global el acoso escolar, procurando igualmente que sea sencillo y de rápida cumplimentación. Han participado 10795 estudiantes de Educación Secundaria Obligatoria con una edad media de 13.94 años (51.1% chicas y 48.9% chicos), pertenecientes a centros públicos (54.4%) y concertados (45.5%) del Principado de Asturias (España). La muestra total se dividió aleatoriamente en dos mitades para realizar una validación cruzada con un Análisis Factorial Exploratorio (AFE) y otro Análisis Factorial Confirmatorio (AFC) sobre las citadas submuestras. Los resultados presentan una escala con buena fiabilidad ($\alpha = .86$) e integrada por 27 ítems y 4 factores: Conductas que suponen acoso (F1), Conductas de acoso presenciadas (F2), Conductas de acoso sufridas (F3) y Reacción ante las conductas de acoso (F4). La escala obtenida resulta invariable según la titularidad del centro, sexo y curso. La brevedad, sencillez y confiabilidad de esta escala indican que puede resultar de interés tanto a nivel de investigación o diagnóstico como, a posteriori, en la práctica profesional y de intervención socio-psyco-educativa desde un enfoque eminentemente preventivo o de afrontamiento del acoso escolar durante la adolescencia.

Palabras clave: bullying, Educación Secundaria, violencia escolar, convivencia, validación de instrumentos.

Introduction

One of the main priorities of the educational system is the socialization and inclusion of people through a set of values, norms and behaviours necessary to guarantee the respect of both human rights and the diversity and individuality of each individual (Herrera-Espinoza & Cerezo-Ochoa, 2018).

The preventative and constructive approach to conflicts that arise naturally in socio-educational contexts is one of the most effective strategies for promoting positive and peaceful coexistence in these spaces (Gómez-Ortiz et al., 2017), all the more so given the knowledge that this forms the basis of social and civic cohesion (Rebolledo, 2018). Nevertheless, the evolution of our society has triggered a naturalization of violence as a pattern of everyday interaction (Esteban & Ormart, 2019) from increasingly younger ages (Albaladejo-Blázquez et al., 2013). To this one must add the legitimization, desensitization and indifference to the observation and/or active participation in episodes of this nature (Galán, 2018).

In this respect, it is of relevance to present a conceptual approximation of the term bullying, contextualizing it in the space of a classroom or an educational centre. As such, *bullying* can be defined as an act of violence (of greater or lesser intensity) carried out repeatedly and intentionally, and characterised by an imbalance of power and force between the aggressor and the victim. Ultimately, it is a clear exercise of moral transgression (Ortega-Ruiz et al., 2016) and harassment against which the student is helpless (Olweus, 1998).

Thus, *school bullying*, the central topic of this work, is a phenomenon that generates marked concern on an educational, social, familial and personal level (Amnesty International, 2019); and that is extremely difficult to identify and, consequently, to resolve. The prevalence of this problem, as pointed out by Olweus in the eighties, is reflected in international statistics, which indicate that one in every three students between the ages of 13 and 15 years in the world suffer continuous and persistent bullying (Unicef, 2014), 9.3% have suffered traditional bullying in the last two months, and 6.9% are victims of cyberbullying (Save the Children, 2016). For their part, González-Cabrera et al. (2017) state in their study that 6.1% of Spanish students of the age of 15, suffer from

school bullying on a regular basis, with the average value of the OECD being even higher (8.9%).

This situation is already affecting even Primary Education students (Wandera et al., 2017), it affects more boys than girls (Han et al., 2017; Olweus, 2009), as well as students from families with low socio-economic and educational levels (Suárez-García et al., 2020) and those whose parents show little participation in educational centres (López & Ramírez, 2020). This panorama is complemented by a review of the alarming statistics of adolescent suicides (Molano et al., 2018); anxiety and depression (Caballo et al., 2011; Pabian & Vandebosh, 2016); avoidance of school attendance (Hutzell & Payne, 2018); low self-esteem, feelings of worry and guilt (Beltrán et al., 2015); self-harm (Carballo & Gómez, 2017); inadequate academic performance (Rettew & Pawlowski, 2016); school absenteeism or outbursts; aggression (Méndez & Cerezo, 2018), etc.

Similarly, from the ways in which bullying is manifested, it is evident that we are dealing with an extremely disparate problem, which includes everything from violent acts, such as insults, to serious physical aggressions. The study of bullying requires the contemplation of three fundamental premises: a) the use of force -verbal, physical or psychological- of the bully against the victim; b) intentionality -a conscious desire to wound, threaten, frighten- and c) repetition -an aggressive act that is repeated over time and that triggers the expectation of future attacks in the victim- (Olweus, 2009). Likewise, with regard to the agents involved, in addition to the bully and the victim, the roles of bullying assistants or reinforcers, that collaborate in or incite the assault, and the defenders or strangers, that defend the victim or remain passive in the face of the assault, should be highlighted (Pöyhönen et al., 2012).

On the other hand, this bullying can take place individually or in a group, have the aim of social exclusion (not allowing the person to participate in activities, ignoring them, etc.), and take place in person or via social networks or other digital means of communication, giving rise to what is known as *cyberbullying* (García et al., 2020; Pabian & Vandebosch, 2016; Park et al., 2020). In addition to the indicators set out above, the latter phenomenon is further exacerbated by the anonymity of the person carrying out the bullying, and the potential large-scale exposure to an audience, which is often also unknown (Estévez et al., 2020). While it is not the object of investigation in this study, this topic

is relevant to the understanding of the different possible modalities of bullying.

Likewise, the axiological system of our Western society is characterised by individualism, competitiveness, excessively permissive and undemanding parenting styles, and a culture of minimal effort (Criollo et al., 2020; Gómez et al., 2015), factors that, among others, help to explain the incidence of bullying in our classrooms. It is worth pointing out that both incidences of violence and of bullying can be generated or take place inside or outside the educational centre, with the average age of bullying victims being 10.9 (Ballesteros et al., 2018). These are circumstance that require the implication of the educational community (Grado & Uruñuela, 2017) and of all social agents (Carrascosa & Ortega-Barón, 2018), especially those of the Administration via the offer of resources and supporting structures (Estévez et al., 2018).

In accordance with the above, a proliferation of studies exist that reflect the opinion of the various agents mentioned, on this phenomenon (Esteban & Ormart, 2019). If only for the major repercussions that school bullying can have, it is imperative to continue to explore how it is perceived (on an evaluative level or as a mere spectator) or experienced first-hand. From this stems the need to focus on carrying out studies that give the students themselves a voice (Cava & Buelga, 2018), especially those that are enrolled in Compulsory Secondary Education (ESO), the reason being that this is the educational stage that coincides with pre-adolescence and adolescence. These are evolutionary stages of maximum physiological and socio-affective development (Garaigordobil & Machimbarrena, 2019), as well as being a period of identification and membership of a social group of reference.

For their part, with reference to the analysed content, most of the instruments used for the evaluation of school bullying focus on reviewing the indicators of this bullying (López & Ramírez, 2020; Martínez et al., 2020; Nasywa et al., 2020). Of particular interest to this study, are those that are conducted from the point of view of the observers (Caballo et al., 2012). Among the main research dimensions or factors, the scientific literature includes the following: 1) knowledge, defining characteristics of school bullying and comorbidities; 2) guidelines for action when a case of bullying is detected; 3) coexistence at school; 4) inclusion; 5) contexts in which these acts occurs; 6) victimization received; 7) active or passive attitude of the observers; and 8) lack of discipline and laziness

on the part of the teacher (Caballo et al., 2012; Caso et al., 2013; Cohen et al., 2015; Cuevas & Marmolejo, 2015; Del Rey et al., 2017; López & Ramírez, 2020).

Another of the observed aspects is that the profile of the those that completed the surveys is that of a student in the last few years of Primary Education or in Compulsory Secondary Education (ESO) (Gascón-Cánovas et al., 2016; Ortega-Ruiz et al., 2016; Vera et al., 2017). We also observe that, as yet, there are few studies that explore bullying with a single instrument, and from a first-person perspective (García et al., 2019), or even the reaction towards episodes of bullying (Sokol et al., 2016). The same applies when the sample size of the studies is reviewed, as they are, for the most part, reduced in size and limited to a single centre or institution.

Given the previous premises and arguments, it is pertinent to formulate the objectives of this study in such a way as to be consistent with the design of an instrument that evaluates this construct in an experiential and holistic way (integrating indicators of bullying and examples of bullying that have been observed), focussing on those that have experienced bullying, either as a victim, or as someone who has reacted to an external event. Another objective is to validate the scale on students of Secondary Education centres in Asturias, with the aim of having at our disposal a valid and reliable instrument with which to identify bullying situations in the school environment, both for the role of the victims and that of the witnesses. Specifically, we hope to detect in students certain risk factors that act as predictors to help with the early detection and implementation of formative and informative actions of a psychoeducational nature directed at these students (Moya, 2019). By extension, we hope that this will lead to an improvement in coexistence in a socio-educational (Ortega et al., 2012), familial and community setting (Criollo et al., 2020).

Method

Participants

10795 Compulsory Secondary Education (*Educación Secundaria Obligatoria*, or ESO) students from eight Asturian municipalities

participated in the study. The Executive Plan for Coexistence and the Improvement of Security in Educational Centres and their Surroundings, Instruction 7/2013 of the Secretary of the State of Security (*Plan Director para la Convivencia y Mejora de la Seguridad en los Centros Educativos y sus Entornos, Instrucción 7/2013 de la Secretaría de Estado de Seguridad*) is being implemented in all of these education centres, and the application of the questionnaires was, in fact, done in collaboration with those in charge of this plan. According to data from the Asturian Ministry of Education and Culture, extracted from the System for the Unified Administration of Educational Centres (SAUCE), there are 23476 ESO students in these municipalities, from which it was estimated that a sample of around 2000 students would be representative. With an error margin of 3% and a confidence level of 99%, the sample should include at least 1709 questionnaires.

Specifically, the sample was distributed among public (54.4%) and semi-private (45.5%) educational centres. As far as the gender variable is concerned, 51.1% were girls and 48.9% were boys, the majority were Spanish nationals (93.2%), the mean age was 13.94 (SD=1.3) and, with regard to the academic year, 26.27% were in their first year of ESO, 27.24% in their second, 25.19% in their third, and 21.30% in their fourth.

Instrument y information gathering procedure

The instrument used (Annex I) is based on the Questionnaire for the Assessment of School Violence in Pre- and Primary School (*Cuestionario de Evaluación de Violencia Escolar en Infantil y Primaria, CEVEIP*). In its original version (Albaladejo-Blázquez, 2011), it consisted of 36 items divided into 4 dimensions, while in its validation (Albaladejo-Blázquez et al., 2013), this was reduced to 30 items and 3 dimensions ($\alpha = .86$). The elements of both versions was taken into account, respecting the original dimensions. Specifically, each block includes: 1. Eight behaviours to indicate to what extent they are considered by students to constitute bullying; 2. Eight behaviours to define to what degree they have been witnessed by students in their educational centres; 3. The same eight behaviours to indicate the frequency with which students have been victims; 4. Three proposed actions to deal with these situations. The selection of the items was based on existing literature on the subject, and

the wording was simplified after an initial pilot study carried out on one class of each year of Secondary Education, which was not included in the final study. The choice of this instrument is based on a thorough process of elaboration and validation. It has also been developed in a Spanish context, albeit with a limited sample size (195 participants). With respect to the scale employed, a Likert-type scale was used, with values from 1 (never/completely disagree) to 10 (always/totally agree), thus avoiding the tendency to give a central value.

Given that the aim was to get as many completed questionnaires as possible, the computer rooms of the educational centres were used for this purpose, and the questionnaire was carried out via the Google Forms tool (online). Throughout the process, we collaborated with the National Police, who acted as liaisons with the educational centres. The questionnaire was administered during school hours to ensure that any possible doubts could be resolved. Similarly, anonymity was guaranteed, and explicit approval to administer the survey was obtained from the Asturian Ministry of Education after a prior revision (for example, the question referring to the nationality of the student was eliminated to guarantee anonymity).

Data Analysis

First, the database was analysed to check for the absence of missing values and typical cases, and fulfilment of the assumptions for multivariate analysis was tested, with regard to the normal distribution of the items, linearity and the absence of multicollinearity (Pérez & Medrano, 2010). Then, the database was examined to detect any atypical cases or missing values that might skew posterior analyses, and the MCAR test was applied to analyse their behaviour. Subsequently, the degree of compatibility of the items was analysed with a normal curve (analysis of asymmetry and kurtosis). The assumption of linearity was evaluated by examining the scatter plot matrices, observing whether or not the points were distributed along a straight line. Finally, the bivariate inter-item correlations were calculated to determine the degree and direction of the relationships between the items. To avoid problems of multicollinearity, those that did not show an $r \geq .90$ were considered to be valid (Tabachnick & Fidell, 2001).

The internal consistency and reliability of the questionnaire was established by means of Cronbach's alpha-coefficient (Cronbach, 1951), which was also calculated for eliminated items.

Analysis of the factorial structure or construct validity was carried out via a process of cross-validation using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), randomly dividing the sample into two. The first subsample was made up of 5404 subjects (50,06% of the sample) and the second of 5391 (49,94% of the sample). For the EFA, the maximum likelihood extraction method was used (Lawley & Maxwell, 1971), since it provides estimates for the parameters that the correlation matrix has produced with the greatest observed likelihood if the sample proceeds from a multivariate normal distribution with m latent factors. This method is the most recommended for large samples (more than 300 subjects) (Ortiz & Fernández-Pera, 2018). In addition, the Promax rotation method was used, since this oblique method was considered to be more effective in the identification of a simple structure (Finch, 2006). For the CFA, a maximum likelihood estimation and a combination of absolute and relative adjustment indices were used to evaluate the goodness of fit of the proposed model. Among the absolute indices, the p -value was used, which is associated with the chi-square statistic and the value of the ratio between χ^2 and the degrees of freedom (CMIN/DF), the Goodness of Fit Index (GFI), the Standardized Root Mean Square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA). Among the relative indices, the Comparative Fit Index (CFI), the Incremental Fit Index (IFI), and the Tucker Lewis Index (TLI) were used. For there to be a good fit, the value of CMIN/DF should be lower than 5; that of the GFI should be above .95; The TLI, IFI and CFI values should be greater than .90, with values above .95 considered excellent; and the values of RMSEA and SRMR lower than .08.

To check whether the model stays stable when the variables gender, academic year and classification of the centre are taken into consideration, confirmatory factor analyses were carried out on the subsamples of students of public ($n = 5886$) and semi-private ($n = 4909$) schools, female ($n = 5519$) and male ($n = 5276$) genders, and the four academic years of ESO ($n = 2836$ in first, $n = 2941$ in second, $n = 2719$ in third and $n = 2299$ in fourth year). Given that the model was expected to demonstrate a good fit in all cases, multi-group confirmatory factor analysis (MGCFA) was used to test its factorial invariance as a function of these variables. The analysis was carried out via the successive addition of models, each

one more restrictive than the previous one: First, configural invariance (the factor structure is the same across groups) was tested (M1); then, metric or weak invariance (factor loadings are constrained to be equal) was considered (M2); after which strong invariance (factor loadings and intercepts constrained to be equal) was evaluated (M3); and finally, a strict invariance model was tested (constraining factor loadings, intercepts and residual variances to be equal) (M4). The indicator used to confirm that the models remained invariant was that the difference between the CFIs of successive levels of invariance be equal or inferior to .01, and that the difference in the RMSEA be equal or inferior to .015 (Chen, 2007). The value of χ^2 was also calculated but, due to its sensitivity to the sample size, it was not taken into account. Finally, if strict invariance exists, the observed changes will be attributed to the latent variables, and not to a measurement bias (DeShon, 2004).

The AMOS 22.0 module of the statistical software package SPSS 22.0 was used for the analysis of the collected data.

Results

The initial questionnaire, made up of 27 items, demonstrated a high degree of reliability ($\alpha = .86$). The percentage of missing values was between .0% and .1%, and the results obtained in the MCAR test were $\chi^2 = 252.767$, $DF = 179$, $\alpha = .000$, from which it can be concluded that the missing data are not MCAR (missing completely at random). The EM (Expectation-Maximization) estimation therefore had to be applied, using the Missing Values Analysis module of the program SPSS, since this procedure has distinct advantages in applied contexts (Van Ginkel & Van der Ark, 2005).

The means, standard deviation and normalcy indices of the 27 items of the questionnaire are given in Table 1. It can be seen that all values were below 2 for asymmetry, and below 7 for kurtosis, with the exception of the items “I get beat up in class or at break times”, “My schoolwork is destroyed”, “I receive offensive, insulting or threatening messages via social media” and “Offensive or mocking photos and videos of me are published on the Internet to offend or laugh at me.” This indicates that these items should be excluded from the analysis. However, given the importance awarded to these items in the literature, we decided to take the risk of not eliminating them in order to avoid losing important information, as we believe the elevated asymmetry and kurtosis to be the result of a low occurrence of these behaviours.

TABLE I. Descriptive statistics and univariate normality of the items of the original questionnaire

Items	M	SD	Asymmetry	Kurtosis
1. Insulting someone	6.14	2.63	-.25	-.84
2. Hitting someone	7.94	2.76	-1.35	.68
3. Pushing someone	6.24	2.71	-.40	-.84
4. Bothering someone to prevent them from doing their work	5.80	2.81	-.21	-1.01
5. Taking away or hiding things from someone	5.94	2.85	-.24	-1.05
6. Isolating or ignoring someone	7.41	3.01	-1.02	-.27
7. Calling someone names	6.13	2.91	-.32	-1.05
8. Laughing at someone	6.68	2.91	-.57	-.83
9. Insulting someone in class or at break times	4.79	2.81	.25	-1.07
10. Hitting someone in class or at break times	3.50	2.76	.96	-.24
11. Ignoring or marginalising someone in class or at break times	4.25	3.02	.50	-1.07
12. Bothering someone, not allowing them to do their work or destroying it	3.70	2.86	.79	-.63
13. Taking away or hiding things from someone	4.78	3.05	.29	-1.23
14. Taking videos or photos with a mobile phone to make fun of or ridicule someone	3.10	2.91	1.21	.11
15. Sending offensive, insulting or threatening messages to someone via social media	3.23	2.97	1.11	-.18
16. Publishing offensive or mocking photos and videos or someone on the Internet	2.71	2.78	1.56	1.10
17. I am insulted in class or at break times	2.07	1.99	2.25	4.68
18. I get beat up in class or at break times	1.39	1.29	4.42	21.55
19. I am ignored or marginalised in class or at break times	1.66	1.72	3.15	9.87
20. I am bothered and/or not allowed to do my work	2.04	1.94	2.32	5.12
21. My things are taken away or hidden from me.	2.08	2.01	2.29	4.89
22. My schoolwork is destroyed	1.43	1.37	4.06	17.96
23. I receive offensive, insulting or threatening messages via social media	1.39	1.38	4.32	19.68
24. Offensive or mocking photos and videos of me are published on the Internet to offend or laugh at me.	1.29	1.20	5.25	29.83
25. Telling a teacher	5.64	3.24	-.05	-1.37
26. Telling your family	5.95	3.47	-.20	-1.49
27. Not doing anything	3.34	2.94	1.03	-.25

No correlations of above .90 were observed between items, which indicates that problems of multicollinearity can be ruled out.

From the exploratory factor analysis (EFA) performed on the first subsample (n1 = 5404), four factors were obtained that explained 51.25% of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy gives a value of .89, which is considered to be between “commendable”

and “very good” (Kaiser, 1974), and the Bartlett test of sphericity was significant ($\chi^2 = 73479.720$; $DF = 351$; $p = .000$). All 27 items were maintained, since no communalities below .40, factor loadings lower than .40, or equal or superior to .40 in more than one factor, were found.

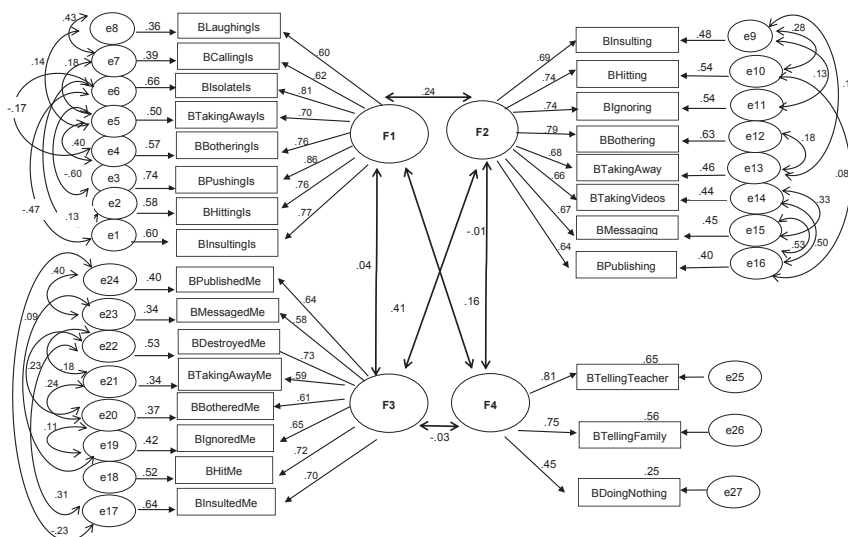
The resulting factors were named “Behaviours that are considered bullying” (F1), “Bullying behaviours witnessed” (F2), “Bullying behaviours suffered” (F3) and “Reaction to bullying behaviours” (F4), and they explain 23.13%, 14.97%, 7.97% and 5.18% of the variance, respectively. The factor saturation of each item is shown in Table 2.

TABLE 2. Factorial structure of the questionnaire

Items	Factor			
	F1	F2	F3	F4
Item1	.806			
Item2	.786			
Item3	.783			
Item4	.739			
Item5	.729			
Item6	.715			
Item7	.672			
Item8	.661			
Item9		.784		
Item10		.784		
Item11		.759		
Item12		.755		
Item13		.730		
Item14		.700		
Item15		.674		
Item16		.643		
Item17			.730	
Item18			.726	
Item19			.707	
Item20			.693	
Item21			.647	
Item22			.634	
Item23			.629	
Item24			.608	
Item25				.791
Item26				.759
Item27				.504

The values obtained from the confirmatory factor analysis of the second subsample ($n_2 = 5391$) indicate an optimal fit of the model, and a significant chi-square value was obtained ($\chi^2 = 3382.209$, $DF = 294$, $p < .000$), a $CMIN/DF = 11.504$ (bearing in mind that this index is highly sensitive to the sample size), as well as the following values for the calculated indices: $GFI = .955$, $RMSEA = .044$, $SRMR = .038$, $CFI = .958$, $IFI = .958$ y $TLI = .950$. Figure 1 shows the parameters of the standardized solution.

FIGURE 1. Confirmatory factor analysis (Subsample 2)



The Cronbach's alpha reliability coefficient of the entire set of items was .86, and that of the resulting factors was .91 (F1), .90 (F2), .86 (F3) and .72 (F4), values considered to be between very good and average.

The obtained results show that the factorial structure of the APAE-A Scale is invariant with regard to the variables "classification", "gender" and "academic year" (Table 3), meeting the established criteria.

TABLE 3. Fit indices for the entire sample, classification, gender, and academic year

Sample	χ^2	DF	GFI	RMSEA	SRMR	CFI	IFI	TLI
Overall	6459.990	294	.957	.044	.038	.958	.958	.950
Public	3665.445	294	.956	.044	.038	.960	.960	.952
Semi-private	3256.911	294	.9553	.045	.039	.953	.953	.943
Female	3443.668	294	.958	.044	.037	.958	.958	.958
Male	3469.606	294	.956	.045	.040	.956	.956	.947
First year ESO	2052.184	294	.949	.046	.042	.957	.957	.949
Second year ESO	1836.848	294	.956	.042	.036	.958	.958	.950
Third year ESO	1969.364	294	.946	.047	.042	.953	.953	.944
Fourth year ESO	1820.253	294	.943	.048	.043	.952	.952	.943

χ^2 = Chi-Squared; DF = Degrees of Freedom; GFI- The Goodness of Fit Index ($p \geq .90$); RMSEA- Root Mean Squared Error of Approximation ($p \leq .08$); SRMR- Standardized Root Mean Square Residual ($p \leq .08$); CFI- Comparative Fit Index ($p \geq .95$); IFI- Incremental Fit Index ($p \geq .95$); TLI- Tucker Lewis Index ($p \geq .95$).

Given that the single-factor model demonstrates an optimal fit for all the subgroups, a multi-group confirmatory factor analysis (MGCFA) was used to test its factorial invariance as a function of the three indicated variables. The results are shown in Table 4.

TABLE 4. Goodness of fit indices of each model tested for factorial invariance with respect to classification, gender and academic year

Model	χ^2	DF	CFI	Δ CFI	RMSEA	Δ RMSEA
Classification						
M1	6922,360	588	.957		.032	
M2	7146,164	611	.955	-.002	.031	-.001
M3	7328,654	621	.954	-.001	.032	.001
M4	7641,927	672	.952	-.002	.031	-.001
Gender						
M1	6913,275	588	.957		.032	

M2	7383,566	611	,954	-.003	,032	.000
M3	7539,877	621	,953	-.001	,032	.000
M4	9663,798	672	,939	-.014	,035	-.003
Academic Year						
M1	7714,860	1176	,955		,023	
M2	7994,188	1245	,954	-.001	,022	-.001
M3	8189,132	1275	,953	-.001	,022	.000
M4	9785,459	1428	,943	-.010	,023	.001

M1. Configural invariance; M2. Metric invariance; M3. Strong invariance; M4. Strict invariance; χ^2 = Chi-Squared; DF = Degrees of Freedom; CFI- Comparative Fit Index, Δ CFI: Increase in CFI; RMSEA = Root Mean Squared Error of Approximation; Δ RMSEA: Increase in RMSEA.

The results of the configural invariance analysis (M1) demonstrate adequate fit indices, which indicates that the factorial structure of the scale remained invariable in all the groups compared. This model was considered to be a starting point for further analyses with greater restrictions. The results of the configural invariance analysis (M2) also show adequate fit indices, with values very similar to those obtained in M1, and that met the established criteria (Δ RMSEA < .015, Δ CFI < .01), indicating that there was no difference between the base-line model (M1) and the restrictive model M2. The fit indices also demonstrated an acceptable fit for Model 3 (M3), in which strong invariance was analysed, as none exceeded the established criteria for incremental values. In Model 4 (M4), acceptable fit indices that met the established criteria were also obtained, which demonstrates residual or strict invariance with respect to all three analysed variables.

Discussion and Conclusions

The complexity that the study of school bullying involves is equalled by the socio-educational importance of its effects (Díaz-Aguado et al., 2013; Martín, 2020). For this reason, the educational system has focused its attention on teaching and promoting peaceful coexistence in schools, seeing this as a construct which is closely linked to bullying. Furthermore, thanks to and by means of an exercise in socialization, a series of norms, values and positive behaviours befitting a democratic, egalitarian and

non-violent society, are transmitted and interiorized (García et al., 2019; López & Ramírez, 2020).

Nevertheless, it is precisely in these school environments that conflictive episodes are bred and take place, episodes characterized by abuse among equals, carried out intentionally and systematically on a psychological and/or physical level, in person or digitally (Grado & Uruñuela, 2017). As a consequence, early detection is essential to avoid the emergence of school bullying behaviours, as well as to avoid these events being hidden, becoming chronic, or being reinforced by the peer group (Garaigordobil & Machimbarrena, 2019; Sánchez & Cerezo, 2014). It is precisely in this context that the existence of instruments to compile information on this subject is fundamental (Caballo et al., 2012; Vera et al., 2017), and many assessment scales for school and cyberbullying exist on an international level.

One of the main contributions that this study makes is therefore the sample size on which the scale was validated (10795 students), which is, furthermore, representative of the general population. While it does not come close to the numbers of studies like those of González González-Cabrera et al. (2017) and Díaz-Aguado et al. (2013), with $n = 27913$ and $n = 23100$ respectively, this work by far exceeded the volumes achieved in other research studies on the subject: 1217 (Thomas et al., 2019), 703 (Guimaraes et al., 2016), 600 (Harbin et al., 2017), 494 (García et al., 2020), 352 (Strout et al., 2018) o 100 (Chan & Márquez, 2020). In addition, we aimed to ensure heterogeneity in terms of the participants of the study, taking into account aspects such as the municipality of residence and the year of Secondary Education, a stage in which this phenomenon is observed with greater frequency and seriousness (Ruiz-Narezo et al., 2020).

On the other hand, the reliability of the Scale for Self-Perception and Perception of School Bullying in Adolescents (*Escala de Autopercepción y Percepción del Acoso Escolar en Adolescentes, APAE-A*) was verified for an educational stage different from that used in the CEVEIP (Albadalejo-Blázquez et al., 2013). This scale is made up of 27 items divided into four factors that provide valid and reliable measures of school bullying, a structure that allows it to be completed quickly and easily. This is precisely what makes it so useful for the empirical research contexts of a problem such as bullying, which is not only multifactorial, but often also camouflaged and silent. In the same sense, another one of the instrument's

strengths lies in its reliability, both on a global level ($\alpha = .86$), and for each factor, with values above .90 in those factors that relate to behaviours that are considered bullying and bullying behaviours witnessed (F1 and F2), very close to .90 for bullying behaviours experienced (F3), and .72 for reactions to bullying (F4).

Likewise, its psychometric properties, together with its excellent internal consistency (reliability), suggest that it is an ideal tool for research, diagnosis and intervention in a range of related fields and disciplines, such as education, psychology and psychopedagogy, all the more so since it has been corroborated that this is a phenomenon that originates in the school environment, but is not restricted to it (Esteban & Ormart, 2019).

With regard to the factorial structure of the scale, we can corroborate that the main dimensions contemplated in other related studies have been included: a) identification of behaviours that are considered bullying (Chan & Márquez, 2020); b) observation of violent behaviours (Caballo et al., 2012; Dobarro et al., 2018); c) victimization received (Gascón-Cánovas et al., 2016; Núñez et al., 2021; Suárez-García et al., 2020) and d) reaction and actions (measures) taken when faced with situations of bullying (López & Ramírez, 2020). Nevertheless, the main potential of the present instrument when compared to other scales with similar factors (Del Rey et al., 2017; Gascón-Cánovas et al., 2016; Hutzell & Payne, 2018; Nasywa et al., 2020; Ortega-Ruiz, et al., 2016; Peraza-Balderrama et al., 2021), is its holistic approach, that is, integrating into a single test dimensions that are usually studied independently or, at best, separately: 1) bullying behaviour; 2) witnessing bullying behaviour (frequency); 3) being a victim of bullying (frequency) and 4) the reaction to violent behaviour.

The limitations of this study include its independent implementation, although this is counteracted by the representation of the population, which facilitates the extrapolation of the findings. With regard to future lines of work, we highlight an interest in complementing the results with qualitative information compiled, for example, via in-depth interviews or discussion groups set up for students. It would also be of interest to consult the collective of families and teachers on the same questions that the students were asked, to find out if they are aware of the occurrence of these conflictive episodes, as well as to obtain information about their attitudes and measures taken. On the other hand, we also advocate replicating the study in later educational stages, or even in the

last years of Primary Education. Likewise, both as a limitation and as a future line of research, it would be of interest to administer other similar questionnaires, in order to analyse the concurrent validity of the scale.

Ultimately, the preventative approach and the psychopedagogical response to bullying requires a joint ecological effort (Espelage, 2014) of the various microsystems (community environment, educational centre and family) that the student is part of (Sánchez & Blanco, 2017). At the same time, this needs to be built on a prior empirical base that is rigorous, solid and reliable, and that can provide information on the specific state of the matter (Nocito, 2017). Thus, the configuration of the APAE-A Scale attempts to make a contribution in this respect, one which will result in and contribute to the design and execution of evidence-based plans and programs that contribute to personal, social, family and work integration (Salgado et al., 2014), serve as a positive response to conflict and promote a peaceful coexistence with benefits that extend to the entire educational community (Prati et al., 2017) and thereby also to society as a whole.

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Annex I

Scale for Self-Perception and Perception of School Bullying in Adolescents (APAE-A)

Below, we present you with a series of statements, so that you can indicate your opinion or to what degree you agree. You can answer freely and honestly, since the questionnaire is anonymous.

- 1) Name of the school: _____
- 2) Year: _____
- 3) Gender: Male Female
- 4) Age: _____
- 5) How many years have you repeated up to now (0, 1, 2...)?: _____
- 6) Father's level of studies:
 No studies Compulsory Secondary Education A-levels/Professional Training
 University
- 7) Mother's level of studies:
 No studies Compulsory Secondary Education A-levels/Professional Training
 University
- 8) I live with:
 My mother and father Only my mother My mother and her partner
 Only with my father My father and his partner With my aunts and uncles, or grandparents
 Others (Who?): _____
- 9) How many brothers and sisters do you have?: _____
- 10) How many of your brothers and sisters live at home?: _____

11) Who works outside of home?:

My father Mi mother Someone else No-one

12) I think I will reach an educational level of:

Compulsory Secondary Education Professional Training (middle-grade)

University Studies

A-levels Professional Training (higher-grade) None

Other (What?):

To what degree do you consider the following behaviours to be school bullying? (1 means "Not at all" and 10 means "A lot")										
Insulting someone	1	2	3	4	5	6	7	8	9	10
Hitting someone	1	2	3	4	5	6	7	8	9	10
Pushing someone	1	2	3	4	5	6	7	8	9	10
Bothering someone to prevent them from doing their work	1	2	3	4	5	6	7	8	9	10
Taking away or hiding things from someone	1	2	3	4	5	6	7	8	9	10
Isolating or ignoring someone	1	2	3	4	5	6	7	8	9	10
Calling someone names	1	2	3	4	5	6	7	8	9	10
Laughing at someone	1	2	3	4	5	6	7	8	9	10
How often have you witnessed someone doing these things to a classmate or another student? (1 means "Never" and 10 means "Always")										
Insulting someone in class or at break times	1	2	3	4	5	6	7	8	9	10
Hitting someone in class or at break times	1	2	3	4	5	6	7	8	9	10
Ignoring or marginalising someone in class or at break times	1	2	3	4	5	6	7	8	9	10
Bothering someone, not allowing them to do their work or destroying it	1	2	3	4	5	6	7	8	9	10
Taking away or hiding things from someone	1	2	3	4	5	6	7	8	9	10
Taking videos or photos with the mobile phone to make fun of or ridicule someone	1	2	3	4	5	6	7	8	9	10
Sending offensive, insulting or threatening messages to someone via social media	1	2	3	4	5	6	7	8	9	10
Publishing offensive or mocking photos and videos of someone on the Internet	1	2	3	4	5	6	7	8	9	10
How often have your classmates or other students done things like this to you? (1 means "Never" and 10 means "Always")										
17.I am insulted in class or at break times	1	2	3	4	5	6	7	8	9	10
18.I get beat up in class or at break times	1	2	3	4	5	6	7	8	9	10

19. I am ignored or marginalised in class or at break times	1	2	3	4	5	6	7	8	9	10
20. I am bothered and/or not allowed to do my work	1	2	3	4	5	6	7	8	9	10
21. My things are taken away or hidden from me	1	2	3	4	5	6	7	8	9	10
22. My schoolwork is destroyed	1	2	3	4	5	6	7	8	9	10
23. I receive offensive, insulting or threatening messages via social media	1	2	3	4	5	6	7	8	9	10
24. Offensive or mocking photos and videos of me are published on the Internet to offend or laugh at me	1	2	3	4	5	6	7	8	9	10
When you have been in or seen situation like the previous ones, how did you react: (1 means "Never" and 10 means "Always")										
Telling a teacher	1	2	3	4	5	6	7	8	9	10
Telling your family	1	2	3	4	5	6	7	8	9	10
Not doing anything	1	2	3	4	5	6	7	8	9	10

Cyberbullying and suicidal behavior in adolescent students: A systematic review

Cyberbullying y conducta suicida en alumnado adolescente: Una revisión sistemática

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Abstract

The main purpose of this research was to carry out a systematic review of the most recent scientific literature on suicidal behavior in victims of cyberbullying. Five databases, Web of Science, Scopus, Psycinfo, Psycarticles and PubMed, were consulted to examine the research published between 2018 and 2020 (both included). After eliminating duplicate papers and applying the inclusion and exclusion criteria, the final study consists of 21 articles. The results of these studies on the prevalence of cyberbullying and suicidal behavior (including ideation, planning, and/or attempts) in adolescent students were analyzed, as well as the data on the chain of suicidal behavior in victims of cyberbullying and the psychosocial risk factors associated with cyberbullying and suicidal behavior.

Variations were found across the studies in the prevalence of cyberbullying and suicidal behavior. In all the studies, relationships between cybervictimization and suicidal behavior were observed. Suicidal ideations and attempts were significantly more prevalent in cyberbullying victims, and this was a risk factor for suicidal behavior in adolescent students. These findings confirm the need to implement effective programs in schools worldwide for the prevention of cyberbullying and suicidal behavior in adolescence.

Key words: cyberbullying, suicidal behavior, adolescents, students, systematic review

Resumen

El propósito principal de este trabajo ha sido realizar una revisión sistemática de la literatura científica más actual sobre la conducta suicida en víctimas de cyberbullying. Se han consultado cinco bases de datos, Web of Science, Scopus, PsycInfo, PsycArticles y PubMed con el fin de examinar los trabajos publicados entre 2018 y 2020 (ambos inclusive). Después de eliminar los trabajos duplicados y de aplicar los criterios de inclusión y exclusión, el estudio final consta de 21 artículos. Se han analizado los resultados de estos trabajos sobre la prevalencia del cyberbullying y de la conducta suicida (incluyendo ideación, planificación y/o tentativa) en el alumnado adolescente, se han examinado los datos sobre la cadena de la conducta suicida en las víctimas de cyberbullying, así como los factores psicosociales de riesgo asociados al cyberbullying y a la conducta suicida. Se encontraron variaciones entre los estudios en cuanto a la prevalencia del cyberbullying y de la conducta suicida. En todos los trabajos se observaron relaciones entre la cibervictimización y la conducta suicida. Las ideaciones y tentativas suicidas fueron significativamente más prevalentes en las víctimas de cyberbullying, siendo éste un factor de riesgo de la conducta suicida en los adolescentes. Estos hallazgos confirman la necesidad de implementar en el contexto escolar en todos los países del mundo programas eficaces para la prevención del cyberbullying y de la conducta suicida en la adolescencia.

Palabras clave: cyberbullying, conducta suicida, adolescentes, alumnado, revisión sistemática

Introduction

The use of Information and Communication Technologies (ICTs hereinafter) has spread so quickly and become so extended in today's

society that it is difficult to find an adolescent who does not use his or her *smartphone* or laptop daily (Buelga et al., 2019). The problem arises when instead of ICTs being used in positive ways, such as to promote positive interpersonal relationships with peers (Ortega-Barón et al., 2021), they are used to cause harm to others.

Cyberbullying is defined as the use of electronic devices by one or more people to intentionally and repeatedly attack someone who cannot easily defend him or herself (Kowalski et al., 2014). This type of online bullying can be direct (threats, insults, isolation, etc.) or indirect (identity theft, hacking, manipulation/distribution of photos or videos, etc.). The prevalence of cyberbullying is highly variable according to the studies; it ranges from 5% to 72% (Zych et al., 2016), with an average incidence of 23% for cybervictims, 16% for cyberbullies, and 18% for the dual role of cyberbully-victim (Buelga et al., 2017). However, there is more agreement among the authors about the fact that more cyberbullies are boys and more cybervictims are girls. Moreover, more cyberbullying victims are observed in students in the first stage of secondary school (junior high), and more cyberbullies and cyberbully-victims are found in older students (Kowalski et al., 2014).

Several factors can explain the global problem of cyberbullying. One of the causes is the availability and almost complete presence of the *smartphone* in the young population in recent years (Buelga et al., 2019). In Spain, 41.4% of 11-year-old preadolescents have this device, and 95.7% have a *smartphone* at age 15 (National Institute of Statistics [INE], 2020). In addition, the anonymity of the Internet means that many victims do not know the identity of their cyberbully, and they feel particularly vulnerable because they do not really know who is attacking them (Kowalski et al., 2014). This helplessness and hopelessness felt by victims is exacerbated by the 24/7 accessibility (24 hours a day, 7 days a week), viral nature, and loss of control over harmful contents uploaded to the Internet (Ortega-Barón et al., 2019).

Therefore, cyberbullying can cause even more harm to the victim than traditional bullying (Estévez et al., 2020; Navarro et al., 2015), and the distress increases when the victim experiences various victimizations (Cava et al., 2020; González-Cabrera, Machimbarrena, Fernández-González, et al., 2019; Quintana-Orts et al., 2021). The fact is that most of the time there is a situation of poly-victimization, where traditional bullying overlaps with cyberbullying (González-Cabrera, Machimbarrena,

Ortega-Barón, et al., 2019; Víllora et al., 2020). In this regard, Kowalski et al. (2014) find that approximately 80% of traditional bullying victims are also victims online.

Certainly, cyberbullying is a global public health problem (Dennehy et al., 2020; John et al., 2018; Kwanya et al., 2021) whose impact has been associated with several indicators of psychosocial maladjustment, among which suicidal behavior stands out due to its severe consequences. In the meta-analysis by Van Geel et al. (2014), the authors show that 20% of cyberbullying victims have suicidal ideations, and between 5% and 8% have attempted self-harm. Suicidal ideation is the first link in the chain of suicidal behavior; it is a predictor of future attempts and completed suicide (Yazdi-Ravandi et al., 2021). The World Health Organization [WHO] (2019) reports that suicide in young people from 15 to 19 years old is the second leading cause of death in girls and the third leading cause in boys. In Spain, as in the rest of the world, suicide in young people has increased considerably in recent years (INE, 2021). Thus, whereas in 2008 and 2009 there were 88 suicides in adolescents from 15 to 19 years old, in 2018-2019 the figure rose to 138 suicides.

Given this background, the main purpose of this study was to conduct a systematic review of the most recent scientific literature on cyberbullying and suicidal behavior in adolescent students. Specifically, we were interested in discovering a) the prevalence of cyberbullying and suicidal behavior in different countries and continents, and the differences found according to the sex and age of the adolescent; b) the results on suicidal behavior in victims of cyberbullying; and c) the risk and protective factors associated with cyberbullying and suicidal behavior.

Method

We followed the criteria of the Preferred Reporting Items for Systematic reviews and Meta-Analyses protocol, PRISMA-P (Shamseer et al., 2015). The study was also included in the International Prospective Register of Systematic Reviews (PROSPERO, ID: CRD42021259414).

The information search was carried out between October and December 2020 (both included), and five databases were consulted: Web of Science, Scopus, PubMed, PsycInfo, and PsycArticles. The search

terms (in title, abstract, or keyword) were: Cyberbullying AND Suicidal (OR Suicide) AND Victims (OR Victimization). The search focused on the past three years (2018, 2019, 2020), in order to include the most recent evidence about the topics studied.

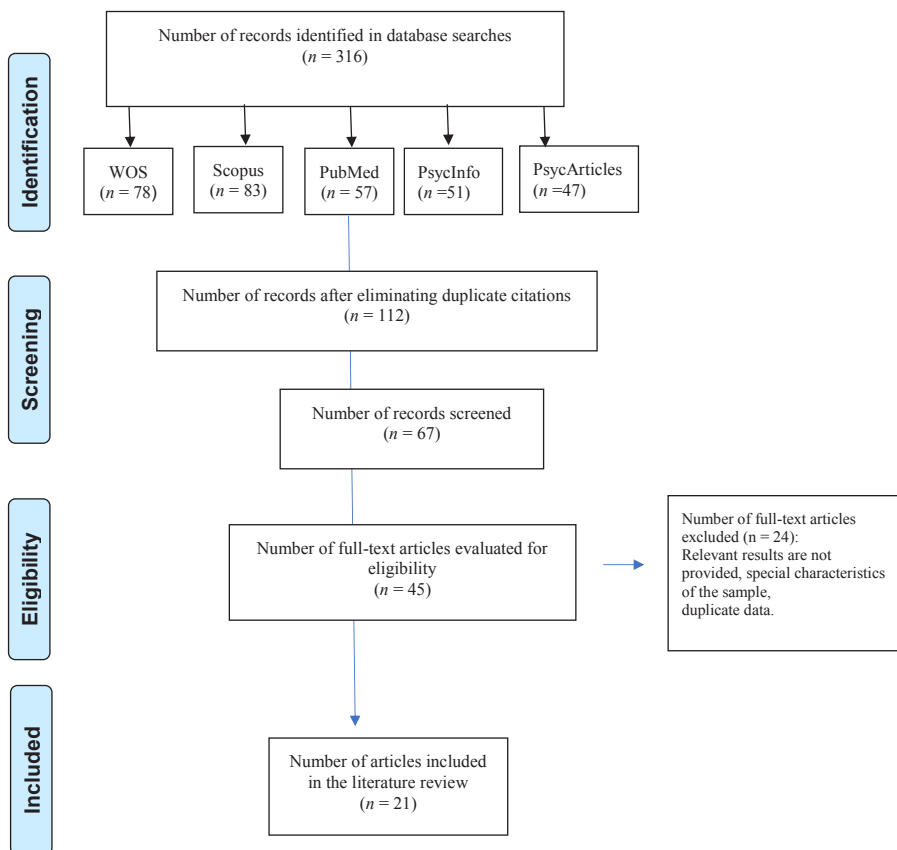
The inclusion criteria for the papers were that they had to: a) analyze suicidal behavior in victims of cyberbullying; b) be published between 2018 and 2020; c) examine this topic in students from 11 to 18 years old); and d) be written in English or Spanish. The following were excluded: a) articles that did not provide relevant results on the topic; b) articles with samples in populations of adults and/or with special characteristics; c) studies not published in English or Spanish; d) papers that were not scientific articles.

Results

Study selection

In the initial information search phase (Figure 1), 316 articles were found in the five databases consulted, with the largest number found in Scopus ($n = 83$). The references for these 316 articles were imported into the Zotero bibliography manager, eliminating duplicate papers ($n = 204$). After the screening process (Figure 1), 45 full-text articles were evaluated, and 24 of them were excluded because they did not meet the eligibility criteria. The literature review for our analysis, finally, consists of 21 studies. The screening and eligibility process and the final study selection were performed by two authors of this manuscript. Cohen's Kappa coefficient of agreement between the researchers in the screening phase was $\kappa = 0.714$, and $\kappa = 0.833$ in the phase of eligibility and final selection of the articles.

FIGURE I. PRISMA Flow chart for study selection



Characteristics of the selected studies

The studies were carried out on all the continents except Africa. They were conducted in North America (n = 8); the United States stood out with five studies, and Canada had three. In addition, there are several studies from Asia (n = 7), carried out in South Korea, Japan, Vietnam, China, and Taiwan. Likewise, several studies were conducted in Europe

($n = 5$), predominantly in Spain with three studies; and one study was carried out in Australia.

Compared to 2018 ($n = 4$), twice as many articles were produced in 2019 ($n = 8$) and in 2020 ($n = 9$). In terms of journals and publication categories, the psychiatry category stands out ($n = 8$), as well as the journal *Psychiatry Research* with three articles (14.2%), published in 2018, 2019, and 2020, respectively. Articles published in the public, environmental, and occupational health category ($n = 6$) and the psychology category ($n = 5$) can also be highlighted. Moreover, 80% of the articles from Asia were published in the *BMC* series in various health science journals.

TABLE I. Summary of characteristics of the articles sorted by year of publication

Year	Authors	Country	Journal
2020	Abrahamyan et al.	Portugal	Journal of Child & Adolescent Mental Health
2020	Baiden & Tadeo	USA	Child Abuse & Neglect
2020	Islam et al.	Australia	Psychiatry Research
2020	Kim, Walsh, et al.	USA	Journal of School Nursing
2020	Kim, Shim, et al.	South Korea	Children and Youth Services Review
2020	Nagamitsu et al.	Japan	BMC Pediatrics
2020	Nguyen et al.	Vietnam	BMC Public Health
2020	Perret et al.	Canada	Journal of child psychology and psychiatry
2020	Sampasa-Kanyinga et al.	Canada	Epidemiology and Psychiatric Sciences
2019	Alhajji et al.	USA	Global Pediatric Health
2019	Chang et al.	Hong Kong	Psychiatry Research
2019	Hinduja & Patchin	USA	Journal of School Violence
2019	Iranzo et al.	Spain	Psychosocial Intervention
2019	Kim et al.	Canada	The Canadian Journal of Psychiatry
2019	Kuehn et al.	USA	Crisis- The Journal of Crisis Intervention and Suicide Prevention
2019	Peng et al.	China	BMC Psychiatry
2019	Wang et al.	Taiwan	BMC Public Health
2018	Extremera et al.	Spain	Frontiers in Psychology
2018	Lucas-Molina et al.	Spain	Psychiatry Research
2018	Rodelli et al.	Belgium	Preventive Medicine
2018	Wiguna et al.	Indonesia	Asian Journal of Psychiatry

Study of the sample population of the analyzed articles

The sample population is composed of 105,437 students in compulsory secondary education (7th-10th grade) and high school (11th-12th grade) between 11 and 18 years old. Almost all the studies included the entire educational cycle. An exception is the study by Nguyen et al. (2020), whose sample consisted only of students in the 6th grade (11 years old). In most of the articles, the distribution of students by sex is proportional, except in the longitudinal study by Kim, Walsh et al. (2020), whose sample has twice as many boys as girls. In addition, 90.4% ($n = 19$) of the studies are based on a cross-sectional design, whereas 9.6% ($n = 2$) use a longitudinal design.

Prevalence of cyberbullying and suicidal behavior

The prevalence of cyberbullying in the cybervictim role ranges from 1.8% in Japan (Nagamitsu et al., 2020) to 22.1% in the United States (Hinduja & Patchin, 2019) (Table II). This percentage increases to 52% in the study by Wigunaa et al. (2018) in Indonesia for the dual role of cybervictim-cyberbully. The prevalence of traditional bullying victimization is reported by several studies (Baiden & Tadeo, 2020; Hinduja & Patchin, 2019; Nguyen, et al., 2020), as well as the continuation of offline victimization in the online context (Baiden & Tadeo, 2020; Islam et al., 2020; Peng et al., 2019). Wang et al. (2019) in Taiwan find that 9.4% of children in school are victims of cyberbullying and traditional bullying. In Spain, in the study by Iranzo et al. (2019), the authors find significant relationships between cybervictimization and school victimization.

Four studies provide data on the prevalence of cybervictimization by gender, and three of them point to a considerably higher percentage of cybervictims among girls (Alhajji, et al., 2020, Sampasa et al., 2020; Wang et al., 2019). With regard to age, Perret et al. (2020) conclude that the highest prevalence of cybervictimization occurs at 15 years of age, which coincides with the results from Lucas-Molina et al. (2018) for boys, but not for girls, whose age of highest risk is 14 years old.

Regarding suicidal behavior, almost all the studies provide data on the first phase of the suicidal chain, analyzing the incidence of suicidal thoughts in students. The prevalence of suicidal ideation presents, as in

cyberbullying, considerable variability, ranging from 6.8% - 7.1% (Nguyen et al., 2020; Wigunaa, et al., 2018) to 23.2% - 25.7% (Lucas-Molina et al., 2018; Nagamitsu et al., 2020). However, in many studies, the prevalence of suicidal ideation is between 15% and 20% (Baiden & Tadeo, 2020; Chang et al., 2019; Rodelli et al., 2018). Only three studies provide data on suicide planning, with the incidence also varying between 2.9% (Nguyen et al., 2020) and 14.5% (Alhajji et al., 2019). Nine studies report the prevalence of suicide attempts, which range from 1.4% to 8.5% (Nguyen et al., 2020). There is more risk of suicidal behaviors in girls (Iranzo et al., 2020; Kim, Walsh et al. (2020). Regarding age, the results are inconclusive (Lucas-Molina et al., 2018; Perret et al., 2020). Thus, whereas in Canada, Perret et al. (2020) find that the age of highest risk of suicidal ideation and attempts is 17 years old, Nagamitsu et al. (2020), with a sample of 22,419 students in Japan, conclude that the age of highest risk of suicide attempts is 14-15 years old.

Cybervictimization and suicidal behavior

All the studies find significant relationships between cyberbullying and suicidal behavior. On the one hand, studies reveal that more than one-third of cybervictims (Abrahamyan et al., 2020; Peng, et al., 2019), and even almost half and more than half (Alhajji et al., 2020; Nagamitsu et al., 2020), have suicidal ideations. Almost 20% of cybervictims have made suicide attempts in the study by Nagamitsu et al. (2020), and 11.1% of 11-year-old cybervictims have attempted suicide according to the study by Nguyen et al. (2020).

On the other hand, regarding the degree of risk, the study by Chang et al. (2019) concludes that the probability of suicidal ideation in cybervictims increases 148%. In addition, some studies find that the risk of suicidal ideation in cybervictims increases considerably when they are also victims of school bullying (Abrahamyan et al., 2020; Baiden & Tadeo, 2020; Islam et al., 2020). Articles on sex differences in cybervictims' suicidal behavior agree that girls are at a greater risk of ideations (Abrahamyan et al., 2020; Kim et al., 2019; Kuehn et al., 2019; Rodelli et al., 2018) and self-harm attempts (Kuehn et al., 2019). This partially agrees with the study by Alhajji et al. (2019). Although these authors note that the risk of suicidal ideation is higher in girls, the risk

of suicide planning and attempts is higher in cybervictimized boys. With regard to age, Perret et al. (2020) find that there is a higher prevalence of suicidal ideation at the age of 15 in cybervictims, and of suicide attempts at the age of 17. In addition, Rodelli et al. (2018) find in Belgium that suicidal ideation is more frequent between the ages of 12 and 14.

Factors associated with cyberbullying and suicidal behavior

Some studies express interest in some individual psychological risk factors associated with suicidal ideation: depressive symptomatology (Baiden & Tadeo, 2020), sadness and hopelessness (Abrahamyan et al., 2020), low self-esteem (Kim, Shim, et al. 2020), negative emotions (Iranzo et al., 2019), and dissatisfaction with life (Chang et al., 2020). Likewise, other authors are interested in individual factors that buffer suicidal behavior in cybervictims, such as emotional intelligence (Extremera et al., 2018) and healthy lifestyles (Rodelli et al., 2018).

In some studies, on family variables, authors such as Nagamitsu et al. (2020) and Sampasa et al. (2020) find that poor quality family relationships between parents and children increase the risk of suicidal ideation in cybervictimized children. In contrast, parental acceptance (Nguyen et al., 2020) and satisfaction with family life (Chang et al., 2019) decrease the effect of cyberbullying on suicidal ideation and self-harm attempts. Regarding the school context, Kim, Walsh, et al. (2020) find in their longitudinal study that school connectedness (sense of belonging, relationships with peers and teachers) significantly reduces the impact of cyberbullying on suicidal behavior. In contrast, academic pressure (Nguyen et al., 2020) and negative experiences at school (Wang et al., 2020) increase the likelihood of suicidal ideation and attempts in students.

TABLE II. Summary of the results of the studies ($n= 21$) on cyberbullying and suicidal behavior

Year	Author	Participants and country	Prevalence of cyberbullying (CB) and other data on CB	Prevalence of suicidal behavior (SB) and other data on SB from the sample	Results on SB in victims of cyberbullying (CVs)	Factors associated with CB and SB
2020	Abrahamyan et al.	2,602 students from 7th grade to 12th grade, 12 -18 years old, Portugal (45.2% ♂, 54.8% ♀).	No data available.	12 months 11.3% suicidal ideation (13.4% ♀, 9.2% ♂).	35.75% CVs have had suicidal ideations (38.5% ♀, 33% ♂) CVs have 5 times + risk of suicidal ideations (6.8 ♀, 5 ♂), and 7.7 times + when there is also bullying (9.7 ♀, 5.8 ♂).	+ prevalence of suicidal ideation in adolescents with sadness and hopelessness, involved in physical fights, and members of single-parent families.
2020	Baiden & Tadeo	14603 students 14 -18 years old, USA. (48 % ♂, 52% ♀).	Past 12 months 5.1 % cybervictims 9.1% cybervictims + victims of school bullying (1 out of every 10 students).	12 months 18% suicidal ideations.	CVs have twice the risk of suicidal ideation, and 3 times + when there is also bullying..	High correlation between depressive symptoms and suicidal ideation.
2020	Islam et al.	2166 students, grades 7-12, 12-17 years old, Australia (52.3% ♂, 47.7% ♀).	12 months 11.8% cybervictims 11.2% cybervictims + bullying.	12 months 7.8% suicide ideation 5.9% planning 2.5% tentative Las ♀ report + suicidal behaviors.	CVs have 8.4+ risk of suicidal planning, 4.7 + of attempt and 5.2 + of attempt and planning. When bullying is also present. 8.8 times + risk of planning, 4.8 times + of attempt, 5.36 + of attempt and planning	People with depression, anxiety are + at risk of being bullied; aggravates mental health of victims. The path from cyber victimization to mental disorders is stronger.

2020	Kim, Walsh, et al.	93 students from 8th grade (T1, T2), 9th grade (T2), 10th grade (T3), 13- 16 years old, USA (66.7% ♂, 33.3% ♀).	30 days: By sex: ♂: 16% cyberbullies, 5% cyber-victims, 16% dual role. ♀: 32% cyberbullies, 8% dual role. No student reported only cyber victimization; all cybervictims were also cyberbullies.	♀ + risk of suicidal behaviors.	Cybervictimization, associated with suicidal behaviors.	Connectedness with school (sense of belonging, relationships with peers, teachers) is a protective factor of CB in suicidal behavior.
2020	Kim, Shim, et al.	7412 students 7th grade to 12th grade, 12- 18 years old, South Korea (58% ♂, 42% ♀).	Cyber-victimization has a direct effect on loneliness, depression, anxiety.	Negative emotions have a direct effect on suicidal ideation.	Direct effect between CB and suicidal ideation, stronger effect with traditional bullying.	Negative emotions mediate the effects of CB and bullying on suicidal ideation Self-esteem moderates the effect of negative emotions on suicidal ideation.
2020	Nagamitsu, et al.	22419 students in grades 7-12, ages 13-18, Japan.	30 days 1.8% experienced CB.	12 months 25.7% suicidal ideations 5.4% attempts 9th grade, 14-15 years old (3 rd ESO) + high percentage of attempts (5.9%). Suicidal ideations high in 7th grade, 12-13 years old (25.7%) and in 11 th grade 16-17 years old (27.6%).	52.0% of CVs have had suicidal ideations, 19.9% attempts. Almost twice as many attempts in ♀ (6.6% vs. 3.5%). Cybervictimization major risk factor for ideation and attempts in all school grades.	7th-9th grade: Stress in family relationships with parents and stress due to traditional bullying + elevated risk factors for suicidal behavior. 10th-12th grade: bullying and stress due to sexual identity.
2020	Nguyen et al.	648 students in 6th grade, 11 years old, Vietnam. (52.3% ♂, 47.7% ♀).	30 days: 9% cybervictims 17.6% bullying victims.	12 months, 7.1% suicidal ideation, 2.9% suicidal planning, 1.4% suicide attempt.	19.6% of the CVs have had suicidal ideations, 21.1% planning, 11.1% attempts.	Perceived academic pressure is related to suicidal ideation and suicide attempts. Perceived parental acceptance decreases suicidal ideation and self-injury.

2020	Perret et al.	Cohort of 2120 adolescents followed at 12, 13, 15, and 17 years of age, Canada.	Longitudinal study: 1.8% cybervictims 15 years old: higher prevalence of CV (4.3% sometimes, 1.2% very often), 19.3% ♀, 10.7% ♂).	12 months Prevalence of suicide ideation/attempt in non-victimized students. 13 and 15 years: 2.7%. 17 years: 4.6%.	Between 2.29 and 4.20 + of suicidal ideation and attempts in CVs. Prevalence of suicidal ideation/ attempts in CVs: 15 years: 22.7%. 17 years: 40.6%.	Victim of traditional bullying is associated with suicidal behavior over time. CB is an immediate + risk factor for suicide in the first two years of bullying.
2020	Sampasa-Kanyinga et al.	5478 students, grades 7 to 12, 12- 20 years old, Canada (52.2% ♂, 47.8% ♀).	12 months 18.7% cybervictims (15.4% ♂, 22.2% ♀).	12 months 12.4% suicidal ideations (8.5% ♂, 16.3% ♀), 3.2% attempts (1.8% ♂, 4.6% ♀).	CVs have 2.38 + risk of suicidal ideations and 2.07% + of attempts.	Poor parent-child relationships and the male gender are risk factors for suicidal ideation in CVs.
2019	Alhaji et al.	15465 students from 9th grade to 12th grade, USA (51.3% ♂, 48.7% ♀).	12 months 15.5% cybervictims (32% ♂, 68% ♀).	12 months 17.6% suicidal ideations, 14.5% planning.	Cybervictims: 41.2 % have ideations 34.5%, suicide planning. ♀ have 2.5 times + probabilities of being cybervictimized and 2 times + of suicidal ideations. ♂ have 2.5 times + probabilities of suicide planning.	Cybervictims transfer their negative experience to others.
2019	Chang et al.	3,522 students 7th grade to 12th grade, 13 - 17 years old, Hong Kong (56.2% ♂, 43.8% ♀).	12 months 11.9% cybervictims.	12 months 21.8% suicidal ideations.	148% increased likelihood of suicidal ideation in cybervictims 3 times + risk of suicidal ideation in cybervictims.	Satisfaction with life partially mitigates effect of CB on suicidal ideation.
2019	Hinduja & Patchin	2670 students 12 - 17 years old, USA. (49.6% ♂, 49.9% ♀).	30 days Cybervictimization ranges according to bullying behavior. The + prevalent: 22.1% (someone posted mean or hurtful comments about me), 19.6% (someone spread rumors about me).	12 months 16.1% suicidal ideation (16.7% ♀ y 15.3% ♂). 2.1% attempts (2.2 % ♀ y 2% ♂).	Cybervictims have 1.6 times + risk of suicidal ideation and 1.02 times + risk of attempts, When bullying is also present, cybervictims have 5.4 times + risk of suicidal ideation and 11.4 times + risk of suicide attempts.	Older students (15-17 years) + risk of suicidal behavior (ideation and attempt).

2019	Iranzo et al.	1062 students 7th grade to 12th grade, 12- 18 years old, Spain. (51.5% ♂, 48.5% ♀).	12 months Cyberbullying is positively associated with relationships higher with relational bullying, followed by verbal bullying.	Last week suicidal ideation Significant sex differences; ♀ score higher on suicidal ideation. Suicidal ideation associated with psychological distress and perceived stress..	Direct effects between cyber-victimization and suicidal ideation, and indirect effects of these variables through perceived stress, loneliness, psychological distress, and depressive symptoms.	The variables of psychological distress, stress, loneliness, depressive symptomatology, and psychological discomfort are antecedents of suicidal ideation.
2019	Kim et al.	4940 students Grades 7 to 12, 13 -17 years old, Canada (43. 3% ♂, 56. 7% ♀).	12 months 10.5% cybervictims (2 or + times) (13. 3% ♀ and 7.8% ♂).	12 months 13.5% suicidal ideations (18% ♀ and 9.1% ♂).	Cybervictims have 3.5 + risk of having suicidal ideations (4.6 ♀ and 2.4 ♂).	Cyber-victimized ♀ have + risk of consuming substances, non-significant association for ♂.
2019	Kuehn et al.	10404 students, 7th grade to 12th grade, from 12-19 years old, USA	12 months 19.0% cybervictims: 11.3% for LGTB, 5. 4% academic difficulties.	12 months 8.5% suicide attempt.	Cyber-victimization increases the risk of suicide attempt by 10.4% in the presence of the covariates: female sex, sleep problems, fights, obesity, computer time, traditional bullying, etc.	LGBT sexual orientation is associated with bullying (r=.20) and CB (r=.26).
2019	Peng et al.	2647 students, 7th grade to 9th grade, 12 - 14 years old, China. (48. 8% ♂, 51.2% ♀).	12 months 9% cybervictims, 3.5% victims of CB + bullying	12 months 23.1% suicidal ideation (19.4% ♀ y 14.0 % ♂) 3.0% ideation + self-injury (4.2% ♀ y 2% ♂). 4.2% suicide attempt (5.9% ♀ y 2.6% ♂).	Cybervictims: 27.4% have suicidal ideation, 6.2% suicidal ideation and self-harm, 6.8% suicidal attempts. Cybervictims + Bullying: 35.9% suicidal ideation, 7.6% suicidal ideation and self-injury, 14.1% attempts. CB risk factor for suicidal ideation and self-injury with ideation. CB + bullying risk factor for suicide attempts.	Polyvictimization (CB and bullying) + vulnerable group for emotional maladjustment. Psychopathological symptoms: risk factors in a) suicidal ideation; b) ideation and self-injury; c) suicide attempts.

2019	Wang et al.	2028 students in 10th grade and 11th grade, 14- 20 years old, Taiwan (48. 6% ♂, 51.4% ♀).	2 months 9.9% cybervictims, (61% ♀). 13.3% victims of traditional bullying 9.4% victims of CB + bullying (70% ♀).	30 days Suicidal ideation 6.6% cybervictims, 15.6% cybervictims + victims of bullying.	Combined bullying (traditional bullying and CB) in the dual role of bully-victim is associated with suicidal ideation, and also with being a boy ♂	Bullying and CB overlap. Other risk variables in combined bullying in the dual role of victim and bully are negative experiences at school and Internet addiction.
2018	Extrem- era et al.	1660 students, 7th grade to 12th grade, 12- 18 years old, Spain (49.6% ♂, 50. 4% ♀).	Cybervictimiza- tion is negatively associated with EI and self-esteem. + cybervictimiza- tion in ♀.	+ risk of suicide (ideations and behavior) in ♀.	+ Relationship between suicide risk and cyber- victimization.	EI has a buffer effect between cybervictimiza- tion and suicide risk.
2018	Lucas- Molina et al.	1664 students, 9th grade to 12th grade, 14 -19 years old, Spain. (47% ♂, 53% ♀).	2 months 6.4% cyber-victims by Internet 8.6% cybervictims by mobile phone. + prevalence of cybervictimization in adolescents + young adults, 15 years old in ♂, 14 years old in ♀.	12 months 23.2% suicidal ideation. There are + suicidal ideations in the ♀. No significant differences by age.	Direct positive relationship between the three types of cyberbullying and suicidal ideation.	Subjective wellbeing and the female gender indirect variables between cyber- victimization by mobile phone and traditional bullying with suicidal ideation.
2018	Rodelli et al.	1037 students, 7th grade to 12th grade, 12 -18 years old, Belgium (50% ♂, 50% ♀).	6 months 7.4% cybervictims 9% cyberbullies 49.5% spectators of CB	6 months 22% suicidal ideations.	Female cybervic- tims and cyber- bullies and with younger ages (12-14 years) + risk of suicidal ideation.	Healthy lifestyles (diet, sleep, physical activity) decrease suicidal ideation in cyber- victims and cyberbullies.
2018	Wigunaa et al.	2917 adolescents 11- 18 years old, Indonesia	6 months 5.1% cybervictims 2. 4% cyberbul- lies, 52.% cybervictim/ cyberbully 12-14 years + risk of having the role of cybervictim and cyberbully. 15-17 years + risk of dual role.	6.8% suicidal ideation 6.3% self-injury 2.4% suicide attempt Being a victim of CB increases the risk of self-injury.	♀ cybervictims and cyberbullies have 1.90 + risk of suicide ideations and 2.11 + risk of attempts.	Male cybervic- tims/cyberbullies have + risk of externalizing behavior: smok- ing, alcohol consumption, and self-injury, whereas ♀ have + risk of internalizing with suicidal ideation and attempts.

Conclusions

The main purpose of this study was to conduct a systematic review of the most recent scientific literature on cyberbullying and suicidal behavior (including ideation, planning, and/or attempts) in adolescent students. Regarding the first objective of this study on the prevalence of cyberbullying, significant variability was observed across the studies (Lucas-Molina et al. 2018; Nagamitsu et al., 2020; Sampasa et al., 2020), and even within the same country (Alhajji et al., 2020; Baiden & Tadeo, 2020). The prevalence of cybervictimization ranged from 1.8% in Japan (Nagamitsu et al., 2020) to 22.1% in the United States (Hinduja & Patchin., 2019). The conceptual and methodological divergence between different studies in assessing the problem of cyberbullying (Kowalski et al., 2014), as well as the sociocultural context of the participants (Chun et al., 2020), may explain these variations across studies.

Despite these divergences between some of the studies, it is worth mentioning that a certain consensus was found among the North American authors regarding the time interval for measuring cyberbullying. All the studies carried out in the United States (except the study by Hinduja & Patchin, 2019), Canada, and Australia measure cyberbullying in the previous 12 months. In Asia and Europe, the time period varies considerably: the past 30 days (Nagamitsu et. al, 2020, Nguyen et al. 2020), two months (Wang et al., 2019), six months (Rodelli et al., 2018, Wigunaa et al., 2018), and 12 months (Peng et al., 2019; Lucas-Molina, 2018). This might explain why the mean prevalence of cybervictimization in North America is higher (15%) than what was found in studies from Asia and Europe, dropping to 7% when cyberbullying is measured in a shorter time interval. In previous studies carried out in Spain by Buelga et al. (2010) and by Navarro et al. (2015), in which cyberbullying is assessed in the previous 12 months, the prevalence obtained by the authors ranges, as in North America, between 20 and 25%.

In addition, some studies, such as the one by Baiden & Tadeo (2020), showed that a high percentage of adolescents are victims of cyberbullying and traditional bullying, which is consistent with the idea of the continuation and overlapping of offline and online victimization (González-Cabrera, Machimbarrena, Ortega-Barón, et al., 2019). Moreover, in line with previous studies (Kowalski et al., 2014), girls were found to be more vulnerable than boys to both types of victimization (Alhajji

et al. 2020; Sampasa et al. 2020; Wang, 2019). With regard to age, the studies by Perret et al. (2020) and Lucas-Molina et al. (2018) agree with previous studies (Yubero et al., 2017) by showing a higher prevalence of cybervictimization in early adolescence (Buelga et al., 2010; John et al., 2018).

Regarding the prevalence of suicidal behavior, almost all the studies assessed this variable using the previous 12 months as a criterion, and they all provide data on suicidal ideation. The prevalence of the first antecedent of suicide, that is, ideations in students, ranges between 17 and 20% in Asia (Chang et al., 2019; Nagamitsu et al., 2020; Peng et al., 2019), Europe (Lucas-Molina et al., 2018; Rodelli et al., 2018), and the United States (Alhajji et al., 2020; Baiden & Tadeo, 2020). Only three studies provide data on suicide planning (Alhajji et al., 2019; Islam et al., 2020; Nguyen et al., 2020). The prevalence of suicide planning and suicide attempts in adolescent students in the United States ranges from 8.5% (Kuehn et al., 2019) to 14.5% (Alhajji et al. 2019). Findings from studies that analyzed gender differences in suicidal behavior agree that, as in cybervictimization, being a female is a risk factor (Iranzo et al., 2019; Kim, Walsh, et al., 2020).

Regarding the second objective of our review, all the studies find significant relationships between cyberbullying and suicidal behavior (Abrahamyan et al., 2019, Iranzo et al., 2019; Peng et al., 2020). Studies that provide data on the prevalence of suicidal ideation in cybervictims report high percentages, ranging from 30% in Portugal (Abrahamyan et al., 2019) to 52% in Japan (Nagamitsu et al., 2020). In addition, 20% of Japanese adolescent cybervictims (Nagamitsu et al., 2020) and 11.1% of 11-year-old Vietnamese cybervictims (Nguyen et al., 2020) had attempted self-harm in the past year. The young age of Vietnamese cybervictims who, with hardly any life history, attempt to take their own lives and have a very high risk of subsequent attempts (Okamura et al., 2021; WHO, 2019), is very disturbing. It is true that, in Asia, a current priority in countries such as Japan is suicide prevention in young people, through municipal policies that allow greater early targeting and intervention in high-risk groups (Okamura et al., 2021).

Regarding the degree of cyberbullying risk in suicidal behavior (Hinduja & Patchin, 2019; Kuehn et al., 2019; Sampasa et al., 2020; Wigunaa et al., 2018), Chang et al. (2020) observed that cybervictims are 148 times more likely to have suicidal ideations and five times more

likely to plan and carry out self-harm attempts (Islam et al., 2020). The risk of suicidal behavior in the victim increases when traditional bullying also takes place (Abrahamyan et al., 2020; Baiden & Tadeo, 2020; Hinduja & Patchin, 2019). These data point to the idea of the cumulative and negative risk of victimization experiences for the victim's mental health (Cava et al., 2020; González-Cabrera, Machimbarrena, Fernández-González, et al., 2019).

Finally, suicidal behavior in cybervictims can be buffered by some individual, family, and school factors. Emotional intelligence (Extremera et al., 2018) and healthy lifestyles -diet, sleep, and physical activity- (Rodelli et al., 2018) are some individual factors suggested in some studies in this review. In addition, parental acceptance and family satisfaction are family protective factors that decrease the impact of cyberbullying on suicidal ideation and self-harm (Chang et al., 2019). Likewise, school connectedness - sense of belonging, relationships with peers and teachers - buffers the negative impact of prolonged cyberbullying on suicidal behavior (Chang et al., 2019).

This review has some limitations; first, there are differences in the conceptualization and measurement of cyberbullying and suicidal behavior across the studies. Second, although the time period for article inclusion is quite recent (2018-2020), the data for the studies were collected before the COVID-19 pandemic, and these issues may have worsened during the pandemic. Third, most of the studies are cross-sectional, which keeps us from establishing a cause-effect relationship between cyberbullying and suicidal behavior. Fourth, there are sociocultural differences between the studies that must be taken into account when interpreting their results.

Despite these limitations, this international review provides very interesting data on cyberbullying and suicidal behavior in adolescent students. These results ratify the WHO (2019) imperative on the global priority of establishing effective action plans for the prevention of suicide in the youth population and the healthy use of ICTs in the school context.

References

References marked with an asterisk (*) indicate the studies included in the review:

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Cyberbullying and Executive Functions in children and adolescents: a systematic review

Ciberacoso y Funciones Ejecutivas en niños y adolescentes: una revisión sistemática

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Abstract

Cyberbullying, defined as bullying behavior through technologies, has become one of the most frequent psychosocial problems during childhood and adolescence. Brain mechanisms involved in the emergence of aggressive behaviors demonstrate the existence of a relationship between bullying and Executive Functioning. The aim of this research was to conduct a systematic review of published studies relating cyberbullying and Executive Functioning (EF)

in children and adolescents. A systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) review guide. The search for information was carried out in the Web of Science (WOS), Scopus, and Psycinfo databases. The selection of papers consisted of 32 articles that complied with the inclusion criteria. The studies analyzed indicate that there is a moderate relationship between a specific EF profile and being involved in a cyberbullying situation. The results reveal that a lower capacity for inhibition, self-control and problem solving may lead minors to participate as cybervictims, cyberaggressors or cyberaggressors-victimized. The findings are discussed considering the importance of executive functioning in the prevention and intervention of cyberbullying.

Key words: cyberbullying, Executive Functioning, systematic review, childhood, adolescence

Resumen

El ciberacoso, entendido como conducta de acoso a través de las tecnologías, se ha convertido en uno de los problemas psicosociales más frecuentes durante la infancia y la adolescencia. Los mecanismos cerebrales implicados en la aparición de conductas agresivas demuestran la existencia de una relación entre el acoso y el Funcionamiento Ejecutivo. El objetivo de esta investigación fue realizar una revisión sistemática de los estudios publicados que relacionan el ciberacoso y las Funciones Ejecutivas (FE) en niños y adolescentes. Se realizó una revisión sistemática siguiendo la guía de revisión Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). La búsqueda de información se efectuó en la base de datos de Web of Science (WOS), Scopus, y Psycinfo. La selección de trabajos se compuso de 32 artículos que cumplieron los criterios de inclusión. Los estudios analizados indican que existe una moderada relación entre un perfil específico de FE y el encontrarse involucrado en una situación de ciberacoso. Los resultados revelan que una menor capacidad de inhibición, autocontrol y resolución de problemas puede llevar a los menores a participar como cibervíctimas, ciberagresores o ciberagresores-victimizados. Los hallazgos se discuten considerando la importancia del funcionamiento ejecutivo en la prevención e intervención del ciberacoso.

Palabras clave: ciberacoso, Funciones Ejecutivas, revisión sistemática, infancia, adolescencia

Introduction

The massive use of Information and Communication Technologies (ICT) has led to an increase in risks related to cybersecurity, including the case of cyberbullying (Olweus and Limber, 2018). Cyberbullying consists of an aggressive, intentional, repetitive and constant act in time, carried out by an individual or group of individuals, through electronic means of communication, against a victim who cannot easily defend him/herself.

Cyberbullying has emerged as one of the most frequent psychosocial problems in the child and adolescent population, usually exceeding 20% of incidence and reaching prevalences of up to 72% (Escortell, Delgado, & Martínez-Monteagudo, 2020). These percentages usually present substantial variability among studies (Chun et al., 2020; Lozano-Blasco, Cortes-Pascual, & Latorre-Martínez, 2020), mainly due to the measures of analysis used and the inclusion criteria considered, such as the frequency or intensity of aggressive behaviors. The main roles involved in the phenomenon of electronic harassment are (1) the victim, who suffers the harassment; (2) the aggressor, the one who carries out the hostile action; and (3) the aggressor-victimized, who performs both roles simultaneously (Escortell et al., 2020).

Given the fact that cyberbullying is a recent phenomenon, its investigation has increased in recent years, including review studies (Camerini, et al., 2020; Chun et al., 2020; Kwan, et al., 2020). Camerini et al. (2020). These authors reported that cyberbullying is related to stress, anxiety, depression, hostility, loneliness, social problems, low self-esteem, substance use, life dissatisfaction, and suicidal ideation; and it was also associated with Attention Deficit Hyperactivity Disorder (ADHD). Chun et al. (2020) highlighted that cyberbullying was an exponentially growing phenomenon. They also indicated that its measurement presented inconsistencies, as many of their investigations employed ad hoc tests or generated their own questionnaire through different sources. Kwan et al. (2020), for their part, discovered that many of the longitudinal studies evaluated traditional bullying and internalizing problems as risk factors, but there was little evidence on the causal relationship with problematic Internet use, and other environmental factors such as relationships with parents and peers. All of them underlined that there were still gaps to be filled in this field of research.

Executive functioning and cyberbullying

Executive Functions (EF) are a set of cognitive processes that comprise a multimodal system related to the ability to self-regulate and goal-directed behavior, which allows us to regulate our thinking and behavior (Miyake and Friedman, 2012).

Concerning the assessment of EF, psychometric tests that individually evaluate its basic components and neuropsychological batteries that evaluate all the processes involved are available. However, the only drawback of the neuropsychological batteries is that they are rather extensive to be implemented (Navarro-Soria et al., 2019). Furthermore, there are observational scales that allow measuring EF through the perception of specific symptoms. The last ones appear to be the most appropriate option regarding the balance between implementation time and wealth of outcomes.

A number of different components of EF are identified, collected in the scientific literature (Aran Filippetti & Lopez, 2013; Davidson, Amso, Anderson, & Diamond, 2006) frequently associated with aggressive and prosocial behavior: inhibition (the ability to ignore impulses or irrelevant information both internal and external when performing a task); self-control (inhibition behaviors, impulsivity and the need for short-term reinforcement); problem solving (organization of thoughts and planning of actions for the achievement of the goals set); time management (the ability to estimate the course of time, planning of activities and completion of behaviors in the expected period); and motivation/activation (concentration maintained over time while working).

EFs are responsible for regulating behavior, managing emotions and controlling aggressiveness; therefore, they have an essential role in the prevention of bullying. Considering this relationship, the research of Rivera (2018) and Linero-Racines (2019), who found that the role of victim or aggressor is related to a deficit in Executive Functioning, draw special attention. Rivera (2018) assessed 76 students, of whom 26 were bystanders, 24 aggressors, and 26 victims. They were administered a battery of tests, including the Adolescent Peer Aggression Scale, the Zoo Map, the Hanoi Towers, and the Stroop Test, finding that victims had more planning difficulties, and aggressors had less capacity for behavioral inhibition and more frequency of risky impulsive decisions. In contrast, bystanders had greater regulation and planning, well-

controlled interference, and poorer decision making. Linero-Racines (2019) examined 101 adolescents in a bullying situation. She studied the relationship of EFs, behavioral maladjustment, and family functioning with social cognition. She used a neuropsychological assessment protocol to assess EFs and social cognition items, the Multimodal Behavioral Scale to evaluate clinical and adaptive indicators, and the School Coexistence Questionnaire. She reported moderate statistically significant correlations between EFs, such as processing speed, inhibitory control and working memory, and bullying.

These studies show the relationship among EF and traditional bullying behaviors, but do not explore online bullying, cyberbullying. Hence, the main objective of the present study focuses on developing a systematic review examining published studies that analyze the relationship between Executive Functioning and cyberbullying behaviors (victimization, aggression, and aggression-victimization) in children and adolescents. The specific objectives of the study aimed to further analyze inhibition, self-control, problem solving, time management, and motivation/activation of child victims, aggressors, and aggressor-victimized in cyberbullying situations. According to the scarce previous findings, it is expected that children and adolescents in a cyberbullying situation present a less adjusted Executive Functioning profile.

Methods

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) review guide was followed for the systematic review. The search for information was conducted by two authors. The inclusion criteria for the articles were:

- Be peer-reviewed scientific articles.
- To be published until 2020.
- Be indexed in the Web of Science (WOS), Scopus, or Psycinfo database.
- Be written in Spanish or English.
- Having accessible full text.
- To have a sample of children and adolescents between 6 and 18 years of age.

All papers without scientific character, written in other languages, without accessible full text, with adult participants or not directly related to the subject of this research were excluded.

After deciding on the appropriate descriptors for the search of articles through the Medical Subject Headings (MeSH), we proceeded to perform a first exploration, with the main objective of finding studies that broadly related cyberbullying and EF (title, abstract, keywords and full text). The search equation was as follows: “cyberbullying” or “online bullying” or “virtual bullying” or “cyber victimization” and “executive function”. However, no results were obtained.

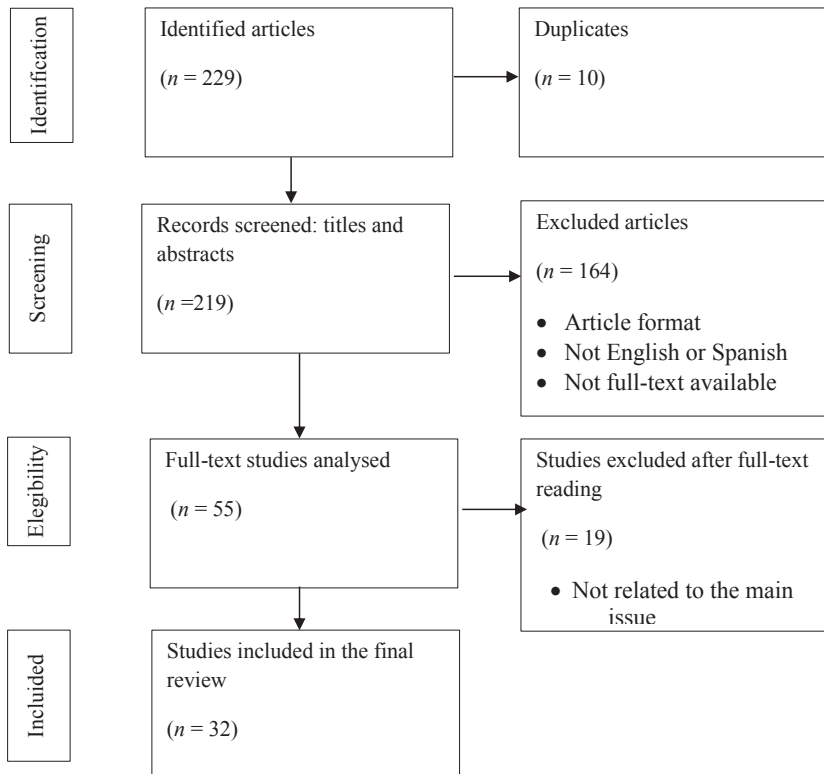
Therefore, a second search was carried out based on the main components of EFs and their relationship with cyberbullying. The search equation was composed of “ cyberbullying” or “online bullying” or “virtual bullying” or “cyber victimization” in the first part, and “inhibition”, “self-control”, “problem solving”, “time management” and “motivation/activation” in the second part, respectively.

Results

Selection of studies and data extraction

The search for information identified 229 articles. After reviewing the different studies, 10 duplicate articles were eliminated, 187 because they did not meet the inclusion criteria (Figure I). The final selection was composed of a total of 32 articles.

FIGURE I. Flow diagram of study selection process.



A qualitative analysis of the technical aspects of the research, such as the origin, date of publication or sample size of the research, as well as the results extracted in relation to cyberbullying and SF, are presented below.

Qualitative analysis

With respect to the country of origin of the research, there was a predominance of papers published in the United States ($n=7$) and Korea ($n=5$), followed by the United Kingdom ($n=4$), Italy, Spain, Germany,

Portugal (n=3) and Turkey (n=2). However, the least represented countries are Brazil, Belgium, Ireland, the Netherlands, Romania, Poland, China, Canada and New Zealand (n=1). Thus, the highest concentration of publications on the subject is in Europe (55%), followed by North America (23%) and Asia (16%). In Africa and Oceania, only one published study per continent was found (6%).

As for the sample, 34% of the papers evaluated children, 40% adolescents, and 26% combined children and adolescents. The predominance of one type of sample over another may be due to a higher prevalence of those involved in cyberbullying situations identified in that age range. Regarding the year of publication, an increasing trend is observed from 2015 to 2019, followed by a gradual decline thereafter. The decrease in research on cyberbullying and EF corresponds to the pandemic by COVID-19.

Regarding the instruments used in the studies analyzed, there are some tests that directly measure cyberbullying, such as Cyberbullying Questionnaire (CBQ), Cyber Victimization and Bullying Scale (CVBS), Bullying and Cyberbullying Behaviors Questionnaire (QCBC), Revised Cyberbullying Inventory (RCBI), and Online Hate Involvement Scale. Nevertheless, most studies utilize self-developed questionnaires or questionnaires created through other sources (Li et al., 2016; You & Lim, 2016; Wachs et al., 2019; Wachs & Wright, 2019).

As for measures used to assess the components of EFs, there are tests that evaluate impulsivity, Barrat Impulsiveness Scale (BIS-11); inhibition, Behavioral Inhibition and Behavioral Activation (BIS/BAS); self-control, Low Self-Control Scale (LSC) or Brief Self-Control Scale (BSCS); problem solving, Problem Solving Inventory (PSI); aggression, Buss-Perry Aggression Questionnaire (BPAQ) or violence, Maudsley Violence Questionnaire. Overall, the high variability between the assessment measures is the result of the lack of agreement on the definition of the phenomenon of EF and cyberbullying.

Relationship between cyberbullying and Executive functions

Due to the lack of papers assessing Executive Functioning as a global construct in relation to cyberbullying, the results analyzed separately, taking into account both the main components of EFs and the different roles of cyberbullying, are presented below (Table 1).

Inhibition

Online disinhibition is the strongest predictor of cyberbullying perpetration (Lee, 2017). Other authors appear to agree with this fact. Thus, Wachs and Wright (2019) add that this online toxic disinhibition and sex have a moderating effect between online hate victimization and the externally held interpretation of that behavior. Especially males are more prone to commit online hate when they experience victimization. Wachs et al. (2019) also report that increased cyberbullying perpetration and online toxic disinhibition are positively linked to perpetration of hate manifested through networks. Harriman et al. (2020) found that online disinhibition is also affected by exposure to hateful messages in the online space and time spent on the internet, academic performance, communication with a stranger on social networks.

Problem solving

Ten studies analyze the relationship between problem solving and cyberbullying and assess the effectiveness of prevention programs. They use different techniques, one of the most used is the Quality Circle (QC; Hamilton et al., 2020; Paul, 2012; Paul et al. 2010) which consists of meeting in small groups to improve problem-solving skills. Another frequently utilized is the practice of coping strategies (Armstrong et al., 2019; Buils et al., 2020; Jose and Vierling, 2018; Bradbury, 2018). Those with the best results are problem solving, seeking social support, and self-control. Besides, many of the programs include the component of social skills work as a bullying prevention measure (Ferreira, et al., 2019; Palladino et al., 2012; Vives-Cases et al., 2019). The common point in all of them is that they share in considering the benefits that the development of problem-solving skills brings on the prevention and/or intervention in cyberbullying.

Self-control

All studies suggest that the capacity for self-control leads to a decrease in the risk of cyberbullying in minors. Thus, Camacho et al. (2021) point out that there is an effect of self-control on anger rumination, which is associated with cybervictimization and cyberaggression. On the same line, Kyobe et al. (2018) actually find that lack of self-control is the strongest predictor of cyberbullying via smartphones.

Indeed, self-control has also been shown to be an effective and preventive coping strategy for cyberbullying (Adorjan and Ricciardelli, 2019; Louise et al., 2018), as well as for the development of positive

social skills (Coelho and Marchante, 2018; Li et al., 2016). These studies have also consistently reported that other factors closely linked to self-control are aggressiveness, disinhibition, and impulsivity (Peker, 2017; You and Lim, 2016).

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Studies have highlighted that the problem of self-control EF deficits not only impacts aggressors, but it has also been found that more impulsive adolescents are less likely to help the cybervictim among observers of cyberbullying (Erreygers et al, 2016).

TABLE I. Cyberbullying and components of EFs.

Authors	Components of EF	Sample	Objective(s)	Instruments	Results
Paul et al. (2010)	Problem solving	N = 32 11-14 years old United Kingdom (UK)	(1) To analyze how Quality Circle (QC) participants created a small anti-bullying working group, and (2) to observe whether they were able to engage in a problem-solving exercise over a period of time with the guidance of a facilitator.	- QC	QC is useful in the prevention of cyberbullying.

Palladino et al. (2012)	Problem solving	N = 375 14-18 years old Italy	To describe and evaluate a peer-led anti-bullying and cyberbullying model.	<ul style="list-style-type: none"> - Bullying and victimization scales (Menesini, Calussi, & Nocentini, 2012). - Cyberbullying Scale (Menesini, Nocentini, & Calussi, 2011). - Coping Strategies Indicator (Amirkhan, 1990) 	Increasing adaptive coping strategies, such as problem solving, and a significant decrease in maladaptive coping strategies, are measures to prevent cyberbullying.
Paul et al. (2012)	Problem solving	N = 30 11-14 year old UK	To further explore the use of QCs as an effective means of collecting information on bullying and cyberbullying.	<ul style="list-style-type: none"> - QC 	QC is useful in the prevention of cyberbullying.
Vazsonyi et al. (2012)	Self-control	N = 25,142 9-16 years old 25 European countries	To test the importance of low self-control in the perpetration and victimization of cyberbullying.	<ul style="list-style-type: none"> - Adolescent Family Process (AFP) - Low Self-Control (LSC) - Bully/Victim Questionnaire (Olweus) 	Negative indirect effects of low self-control on cyberbullying perpetration and victimization.
Rivituso (2014)	Self-control	N = 4 16-19 years old United States of America (USA)	To explore the lived experiences and psychological impact of cyberbullying victimization.	<ul style="list-style-type: none"> - Semi-structured interview 	1) self-control in response to lack of control over cyberbullying instances; 2) distrust of technology and distrust of people; 3) the value of friends in college and its impact on the victim's self-esteem; 4) repeated instances leading to feelings of vulnerability and fear; 5) feelings of stress, depression, and shame; 6) frustration leading to self-blame.
Bayraktar et al. (2015)	Self-control	N = 2,092 12-18 years old Czech Republic	To discriminate between groups of cyberbullying participants (cyberbullies, cybervictims and cybervictim-victims) at the individual and relational level by controlling for age and gender.	<ul style="list-style-type: none"> - Buss-Perry Aggression Questionnaire scale (BPAQ; Buss & Perry, 1992) - Self-Esteem Scale (Rosenberg, 1965) - Parental Attachment Subscale of Parental and Peer Attachment Scale (Armsden & Greenberg, 1987) - Ad hoc 	Stalkers and cyberbullying victims are similar to each other in terms of low self-control, offline aggressiveness, and gender, and have higher scores on measures of low self-esteem and offline aggressiveness.

Erreygers et al. (2016)	Self-control	N = 2,309 9-17 years old Belgium	To examine the relationship between impulsivity and helping behavior in cyberbullying bystanders.	<ul style="list-style-type: none"> - Barrat Impulsiveness Scale (BIS-11; Stanford et al., 2009) - Mpathic Responsiveness Scale (Olweus & Endresen, 2001) - Ad hoc 	The most impulsive adolescents are less likely to help the cybervictim.
Li et al. (2016)	Self-control	N = 518 11-18 years old USA	To utilize the theories of low self-control and social learning in an attempt to further comprehend why adolescents engage in cyberbullying.	<ul style="list-style-type: none"> - Ad hoc 	Components of social learning theory mediate the effect of low self-control.
You and Lim (2016)	Self-control	N = 3,449 11-14 years old South Korea	To analyze the effects of individual and psychological factors on the perpetration of cyberbullying.	<ul style="list-style-type: none"> - Ad hoc 	Longer Internet use, a greater number of previous bullying experiences and victims, a higher level of aggression and lack of self-control are associated with greater perpetration of cyberbullying.
Lee (2016)	Inhibition	N = 321 M = 21.52 years old USA	To examine patterns of cyberbullying and victimization.	<ul style="list-style-type: none"> - Cyberbullying Questionnaire (CBQ; Calvete et al., 2010) - Buss-Perry Aggression Questionnaire scale (BPAQ; Buss y Perry, 1992) 	Online disinhibition is the strongest predictor of cyberbullying perpetration.
Peker (2017)	Self-control	N = 353 14-18 years old Turkey	To explore the predictive effect of self-control on cybervictimization.	<ul style="list-style-type: none"> - Brief Self-Control Scale (BSCS; Nebioglu, Konuk, Akbaba y Eroglu, 2012). - Cyber Victimization and Bullying Scale (CVBS; Cetin, Yaman y Peker, 2011) 	Negative relationship between impulsivity and self-discipline (self-control subscales) and cybervictimization.
Vazsonyi et al. (2017)	Self-control	N = 546 14- 18 years old Turkey	To assess the relationship between maternal and paternal parenting, self-control and bullying/cyberbullying.	<ul style="list-style-type: none"> - Health Behaviour in School-aged Children Survey - Ad hoc 	Parental peer approval predicts bullying both directly and indirectly through low self-control. Low self-control predicts both bullying and cyberbullying behaviors.

Bradbury (2018)	Problem solving	N = 329 11-14 years old USA	(1) To identify the most common coping strategies of adolescents; and (2) to determine from whom young people learn coping strategies for cybervictimization	<ul style="list-style-type: none"> - Internet Experiences Questionnaire (Raskauskas & Stoltz, 2007) - Experiences with Cyber-victimization Measure - Self-report Coping Measure for youth 	Problem solving and seeking social support are most frequently used as coping strategies.
Coelho and Marchante (2018)	Self-control	N = 455 11-15 years old Portugal	To explore how social and emotional competencies develop as a function of engagement in cyberbullying.	<ul style="list-style-type: none"> - Social and Emotional Competencies Evaluation Questionnaire (QACSE; Coelho et al. 2015; Coelho & Sousa 2016) - Self-Description Questionnaire-II (Marsh et al., 1983) - Bullying and Ciberacoso - Behaviors Questionnaire (QCBC; Coelho et al., 2016) 	Participation in cyberbullying (any role) is associated with negative self-control and social awareness trajectories. Victims and bully-victims show a more pronounced decline in self-esteem and relationship skills.
Jose and Vierling (2018)	Problem solving	N = 2,179 10-15 years old New Zeland	To determine whether the ability of cybervictimization to predict sleep adequacy would be mediated by adaptive coping (problem solving) as well as maladaptive coping (rumination).	- Ad hoc	Cybervictimization predicts lower levels of sleep one year after rumination. Problem solving mediates the temporal relationship of cybervictimization with sleep adequacy.
Kyobe et al. (2018)	Self-control	N = 3,500 14-18 years old South Africa	To explore mobile bullying among rural high school students, the factors influencing it, the applicability of the above theories, and legal and policy implications.	- Ad hoc	Mobile harassers are heavy users of chat rooms, Facebook and Twitter. Bullying by teasing increased up to age 14, declined at age 15 but increased again from age 16 to 18. Stalkers are mainly from unstable residential areas and lack of self-control is most predictive of mobile bullying.

Louise et al. (2018)	Self-control	N = 273 13-18 years old Brazil	To examine the prevalence of cyberbullying and its relationship with coping strategies.	<ul style="list-style-type: none"> - Revised Cyberbullying Inventory (RCBI; Topcu & Erdur-Baker, 2010) - Inventario de Estrategias de Afrontamiento de Folkman y Lazarus (Savóia, Santana & Mejias, 1996) 	A prevalence of 58%. The most commonly used coping strategies: self-control, social support and escape-flight (victims) and confrontation (victims and perpetrators).
Armstrong et al. (2019)	Problem solving	N = 321 11-15 years old USA	To compare the use and efficacy of coping strategies in face-to-face and cyber victimization contexts.	<ul style="list-style-type: none"> - Self-Report Coping Scale for Youth (Causey & Dubow, 1992) - Stress Questionnaire (RSQ; Connor-Smith et al., 2000) 	Problem solving is associated with cyber-victimization coping efficacy.
Adorjan and Ricciardelli (2019)	Self-control	N = 115 13-19 years old Canada	To analyze the efficacy of cybersecurity programs in schools.	<ul style="list-style-type: none"> - Grupo focal 	Students acquire a sense of caution and self-control.
Cho and Galehan (2019)	Self-control	N = 2,351 14-19 years old South Korea	To examine the influence of prior criminal behavior on future criminal behavior.	<ul style="list-style-type: none"> - Ad hoc 	The relationship between low self-control and cyberbullying is partially mediated by cyber lifestyles. Prior perpetration of cyberbullying influences subsequent perpetration of cyberbullying.
Ferreira et al. (2019)	Problem solving	N = 676 10-18 years old Portugal	To analyze the relationship between the phases of the bystander intervention model and the mediating role of adolescents' self-efficacy beliefs.	<ul style="list-style-type: none"> - Ad hoc 	Cyberbullying presents a direct and indirect effect on aggressive behavior, and an indirect effect on reporting and problem-solving behavior.

Vives-Cases et al. (2019)	Problem solving	N = 270 13-17 years old Spain, Italy, Russia, Romania, Poland, Portugal	To evaluate the prevention of intimate partner violence (DV) through the promotion of protective factors: communication skills, empathy and problem-solving skills.	<ul style="list-style-type: none"> - Student Social Support Scale-Assesses (Nolten, 1995) - Questionnaire for Evaluating School Social Climate (Trianes, Blanca, De la Morena, Infante & Raya, 2006) - Maudsley Violence Questionnaire (Walker & Bowes, 2013) - Ambivalent Sexism Inventory (Glick & Fiske, 1996) 	The program is effective
Wachs et al. (2019)	Inhibition	N = 1,480 12-17 years old Germany	To test the relationship between cyberbullying and cyberhate and whether this relationship is moderated by online toxic disinhibition.	- Ad hoc	Increased cyberbullying perpetration and online toxic disinhibition are positively related to cyberhate perpetration.
Wachs & Wright (2019)	Inhibition	N = 1,480 12-17 years old Germany	To explore the relationship between victimization and online hate perpetration and the possible moderating effects of online toxic disinhibition on this relationship.	- Ad hoc	Online toxic disinhibition and sex, as moderating effects, affect the relationship between online victimization and online hate perpetration.
Buils et al. (2020)	Problem solving	N = 159 8-12 years old Spain	To evaluate the effect of a cyberbullying prevention program.	<ul style="list-style-type: none"> - Emotional Education Questionnaire (EEQ; Álvarez, 2011) - Cyberbehavior Quality Assessment Scale (Ortega, Del Rey & Sánchez, 2012) 	Significant differences are obtained in the following dimensions: emotional self-awareness, problem solving, responsible use, digital mentoring, and family supervision. The program is effective.
Cho and Rustu (2020)	Self-control	N = 2,351 14-19 years old South Korea	To integrate theories of self-control and opportunity approach to cyberbullying	- Ad hoc	Less self-control and less parental supervision, as well as engaging in more online activities make it more likely to be a cyberbully.

Hamilton et al. (2020)	Problem solving	N = 2,658 14-16 years old Ireland, England, Germany, Italy, The Netherlands	To address cyberbullying in an innovative way through a co-participatory and Quality Circle approach.	- Ad hoc	QC is useful in the prevention of cyberbullying.
Harri-man et al. (2020)	Inhibition	N = 320 14-19 years old USA	To explore predictors of exposure to hateful material in the online space, including demographic characteristics (age, gender, and race), academic performance, online behaviors, online disinhibition, risk perception, and parental monitoring of online activities.	- Hawdon's Online Hate Involvement Scale	Positive association between exposure to hateful messages in the online space and time spent online, academic performance, communication with a stranger in social networks, and benign online disinhibition.
Wood and Graham (2020)	Self-control	N = 9,122 14-17 years old USA	To explore the links between cyberbullying victimization and an of health risk behaviors associated with juvenile delinquency (cigarette smoking, marijuana use, alcohol use, and sexual frequency).	- Ad hoc	Cyberbullying victimization increases the likelihood that a student will be classified in the "at-risk" group. This effect holds when controlling for physical bullying, a measure of self-control, and demographic variables.
Camacho et al. (2021)	Self-control	N = 3,017 11-16 years old Spain	To investigate the associations between cybervictimization, anger rumination, and cyberbullying.	- European Cyberbullying Intervention Project Questionnaire (Del Rey et al., 2015) - Anger Rumination Scale (Sukhodolsky et al., 2001)	Cybervictimization predicts anger rumination and cyberaggression. Anger rumination is associated with a subsequent increase in cybervictimization and cyberaggression. Cybervictimization mediates the association between anger rumination and cyberaggression. Intervention programs should focus on enhancing self-control.
Cho and Glassner (2021)	Self-control	N = 2,351 14-19 years old South Korea	To examine whether there are unique growing paths for cyberbullying perpetration when low self-control and opportunity factors are considered.	- Ad hoc	Low self-control is positively associated with early onset/decline in cyberbullying.

<p>Wang and Ngai (2021)</p>	<p>Self-control</p>	<p>N = 1,103 12-18 years old China</p>	<p>To develop an integrated framework for investigating the effects of power imbalance, the online disinhibition effect, internal states, and parental mediation on cyberbullying.</p>	<ul style="list-style-type: none"> - Physical Self-perception Profile Scale (Lindwall et al., 2011) - Advanced Knowledge of the Internet Scale (Vandebosch & Van Cleemput, 2009) - Self-perceived Social Status Scale (Lee et al., 2018) - Toxic Online Disinhibition Scale (Udris, 2014). - Cyberbullying Perpetration Scale (Wong & McBride, 2018) - Self-Control Scale (Wong et al., 2018) 	<p>Social status among peers correlates directly with cyberbullying, and through low self-control to predict cyberbullying. Online disinhibition effect does not directly correlate with cyberbullying, but through moral disengagement and low self-control to predict cyberbullying. Physical power does not directly correlate with cyberbullying. Parental mediation moderates the effects of online disinhibition on cyberbullying and had no buffering effects when examining the relationships between physical power, social status, technology use, and cyberbullying.</p>
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Source: self elaboration.

Other research studies also indicate the relevance of complementary variables that affect the relationship between EFs and cyberbullying. Song and Lee (2020) highlight that the morality of youngsters plays an important role, whereas Cho and Rutsu (2020), Vazsonyi et al. (2017) and Wang and Ngai (2021) point out that parental control inversely affects bullying through the Internet. Likewise, Wood and Graham (2020) confirm the role of substance use and how being a victim of cyberbullying can become a risk factor for being a cyberbully. This is consistent with Cho and Galeman (2019) who find that lifestyle acts as a significant mediator between self-control and cyberbullying.

Discussion and conclusions

The main objective of this study was to conduct a systematic review to explore the relationship between EFs and cyberbullying in its different

roles (victims, aggressors and aggressors-victimized). The first aspect to highlight is the existence of a lack of review studies on the executive profile in children and adolescents who have been involved in online bullying situations. Hence, the search was adjusted to consider the relationship of cyberbullying together with the different components of EFs (problem solving, inhibition and self-control). A total of 32 published papers were obtained. Given this fact, it is important to highlight the novelty and relevance of this work since its findings allow us to explore a part of cyberbullying that has not been analyzed and that could be of special relevance for prevention and intervention.

From the studies analyzed we can observe that the highest percentage of publications are found in the United States and South Korea. This may be due to the fact that these are two of the countries with the largest population and scientific production in this area of knowledge. We can also observe that Europe is the continent with the highest number of publications. Regarding the year of publication, we observe an increasing trend from 2015 to 2019 with a slight decrease in 2020. This last fact may be due to the confinement situation derived from the COVID-19 pandemic. Due to the closure of both schools and research centers, studies in this field have been decreased, showing a lack of information in this regard. The sample range is fairly balanced among the different age groups, which reveals that this is not a phenomenon that is confined to a single range but is constant throughout childhood and adolescence.

EFs are the result of complex psychological processes which, together with the problematic phenomenon of cyberbullying, makes it especially important to analyze studies that cover different dimensions and variables, giving it greater richness. In light of the results found on the relationship with the different components of EF, it is highlighted that children with executive profile impairments such as lack of impulse control, lack of problem-solving skills, lack of inhibition capacity, etc., have a direct and positive relationship with being involved in a situation of cyberbullying in any of the different roles.

Inhibition allows a person to avoid irrelevant stimulation from both external and internal sources when carrying out an activity (Miyake & Friedman, 2012). This EF is closely linked to impulse control and, therefore, to self-control. This is probably why we would expect aggressors to show a greater deficiency in this aspect and find it difficult to inhibit/control certain behaviors that do not fit in with the social context in which they

find themselves, such as insults, threats or, given that this is an online modality, sending images or inappropriate content. The area of the brain responsible for this task is the prefrontal cortex, which allows or disallows the performance of behaviors that arise in response to deciding how to deal with a given situation, also considering environmental circumstances (Gutiérrez & Solís, 2011). These brain areas are among the last to complete their development, not reaching maturity until 21-23 years of age. If we look at this fact, we can understand why it is the youngest groups that are considered the most impulsive. This explains the fact of the high incidence of cyberbullying during adolescence (Blakemore & Robbins, 2012). From the aggressor's point of view, it is common to find an absence of filter in their self-control. Moreover, this is reinforced by the anonymity provided by the Internet, since online disinhibition is one of the strongest predictors of cyberbullying (Wachs and Wright, 2019). Concerning the victim, the way of dealing with cyberaggressions varies depending on the degree of development of their CPF, with adults being more likely to ignore the messages and provocations, but not the younger population, who end up falling into the cycle of aggression-victimization.

The concept of problem solving is linked to the procedure that makes it possible to solve (or even prevent) an undesirable situation. It begins with the identification of the problem in question. Once identified, it is necessary to establish a plan to develop the action that leads to the resolution. Depending on the context, problem solving may involve following certain steps, sometimes already learned, or it may depend on a single action or a sudden decision. In the case of cyberbullying, both can occur. In either case, the person needs to make decisions. Decision-making can be understood in different ways, as it can refer both to the decision alternatives and to the speed or quality of these decisions among the different actors in the context of bullying. Thus, the impulsivity derived from the absence of inhibition or self-control of the aggressors, leads them to make riskier decisions that cause them to be involved in this type of situations.

We have seen the different risk factors related to cyberbullying so far. But studies also showed that there are individual, social and family factors that act as protectors and decrease the likelihood of children and adolescents being immersed in cyberbullying. Among the personal factors we find good coping strategies (Bradbury, 2012; Louise et al., 2018; Palladino, 2012), high self-esteem (Bayraktar et al., 2015), ability

to empathize (Erreygers et al., 2016) and adequate socioemotional competence (Buils et al., 2020; Coelho and Marchante, 2018), and having a good family environment and support (Bayraktar et al., 2015; Vazsonyi et al., 2012, Vives-Cases et al. 2019).

This study is not without limitations. First, variability in the conceptualization and measurement of both EF and cyberbullying was observed, which makes it difficult to generalize the results and compare results from different studies. In addition, some components that make up EF (e.g., attention, working memory, processing speed) should be included but, due to the length of the study, have been discarded. Likewise, most of the studies are cross-sectional, which makes it impossible to examine the causality of the findings. Also, although there were two investigators in the selection of studies to eliminate possible duplicates, the Kappa Index was not calculated. Furthermore, it should also be mentioned that cultural bias was not taken into account, despite being a factor that may be influencing the activation of EFs and cyberbullying. Morality varies in different cultures and, as a result, cyberbullying behaviors may modify the interpretation of the results. For all these reasons, this study can be considered an initial exploratory review regarding the relationship between executive functions and cyberbullying that should be further systematized in future studies.

Notwithstanding these limitations, this study is a pioneer in the field and is particularly relevant because it covers the need for a review that brings together the different components of EF and cyberbullying. Additionally, these data may be of special relevance for the different agents who intervene with children and adolescents. Teachers, psychologists, educational psychologists, guidance counselors and all specialized personnel involved in this type of conflict can work from their different disciplines to fill these gaps in students who have been immersed in this type of situation. It can also be very useful in terms of prevention, since a program that includes the development of self-control, problem solving and inhibition can have positive effects in reducing cyberbullying in childhood and adolescence. Developing these prevention actions, especially in Primary Education schools, could help to reduce the high prevalence rates that are being observed, providing students with tools to avoid being involved in cyberbullying situations (Rivera et al., 2018).

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What do parents think about cyberbullying?: A systematic review of qualitative studies¹

¿Qué piensan los padres sobre el ciberacoso?: Una revisión sistemática de estudios cualitativos

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Abstract

Cyberbullying is a psychosocial phenomenon that generates harmful consequences for children and adolescents and family involvement is essential to address it. The objective of this review is to analyze the research findings of parents' and caregivers' perspectives on cyberbullying. The search was carried out in the Scopus, Web of Science, PsycArticles and EBSCO databases using the PRISMA statement for systematic reviews and meta-analyses, initially yielding 419 articles, from which 12 were selected. The characteristics of the research were analyzed and the themes of the main findings were identified and grouped based on the principles of thematic analysis. The results indicate that most of the studies were conducted in North American and European countries and involved a higher percentage of women. The studies reviewed provide valuable information on parents' knowledge of different aspects of the problem, such as the existing gap in the knowledge and use of Information and Communication Technologies by adults and children and adolescents. The parents' accounts also focus on parental strategies for the prevention and intervention of cyberbullying, their children's motives for getting involved in these situations, and the barriers to seeking help from children and adolescents in the face of this problem. Their

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opinions also highlight the need for parents and caregivers to receive support to understand and address this phenomenon. In addition, suggestions for future research presented in the analyzed articles were identified, emphasizing the need to continue carrying out studies that incorporate parents and other family members as participants, since they are key actors in the prevention and intervention of cyberbullying in children and adolescents.

Keywords: cyberbullying, parents, caregivers, qualitative research, systematic review.

Resumen

El ciberacoso es un fenómeno psicosocial que genera consecuencias perjudiciales para niños, niñas y adolescentes y para su abordaje es esencial la participación de la familia. El objetivo de esta revisión es analizar los hallazgos de las investigaciones de las perspectivas de progenitores y cuidadores sobre el ciberacoso. Se utilizó la declaración PRISMA para revisiones sistemáticas y meta-análisis y la búsqueda se desarrolló en las bases de datos Scopus, Web of Science, PsycArticles y EBSCO, arrojando inicialmente 419 artículos, de los cuales se seleccionaron 12. Se analizaron las características de las investigaciones y se identificaron y agruparon los temas de los principales hallazgos en base a los principios del análisis temático. Los resultados indican que la mayoría de los estudios se realizaron en países norteamericanos y europeos y contaron con la participación de un porcentaje mayor de mujeres. Los estudios revisados proporcionan información valiosa que da cuenta del conocimiento de los progenitores sobre distintos aspectos del problema, como la brecha existente en el conocimiento y uso de las Tecnologías de la Información y la Comunicación de los adultos y los niños, niñas y adolescentes. Los relatos de los progenitores también se centran en las estrategias parentales para la prevención e intervención del ciberacoso, los motivos de sus hijos/hijas para involucrarse en estas situaciones y las barreras para la búsqueda de ayuda de niños, niñas y adolescentes ante este problema. Sus opiniones también destacan la necesidad de que los progenitores y cuidadores reciban apoyo para comprender y abordar este fenómeno. Adicionalmente se identificaron las sugerencias para futuras investigaciones presentadas en los artículos analizados, donde se enfatiza la necesidad de continuar realizando estudios que incorporen a los progenitores y otros familiares como participantes, ya que son actores clave en la prevención e intervención del ciberacoso en niños, niñas y adolescentes.

Palabras clave: ciberacoso, progenitores, cuidadores, investigación cualitativa, revisión sistemática.

Introduction

The development of information and communication technologies (ICT) has provided beneficial tools associated with learning, communication, entertainment and prevention of risk behaviors for children and young people (Plaza de la Hoz, 2018; Xiao & Hu, 2019). However, it has also favored the emergence of phenomena such as cyberbullying generating harmful consequences that are difficult to cope with and repair (Soriano et al., 2019).

Cyberbullying is defined as an aggressive and intentional act, carried out by an individual or group, through electronic forms of contact against a victim who does not easily defend himself (Mallmann et al., 2018; Smith et al., 2008). Additionally, the existence of three possible roles that can be adopted by those involved is proposed: harasser, victim and witness (Garaigordobil, 2015). The characteristics of the cyber world facilitate not only the participation in this phenomenon but also enables fuzzy boundaries to exist in the involvement in cyberbullying, which could give rise to the overlapping of roles (Mishna et al., 2012), where victims and witnesses could become aggressors and vice versa (Barlińska et al., 2013; Ferreira et al., 2016; Souza et al., 2018).

The prevalence of cyberbullying worldwide has shown variability, associated with the particularities of the investigated sample, contextual differences and the characteristics of the measurement instruments (Kowalski, et al., 2019). A panoramic review incorporating studies from North America and Europe found that there is a higher prevalence in Canada (23.8%) and China (23%) and lower in Australia (5%) and Sweden (5.2%) (Brochado et al., 2016). In addition, in a review of studies carried out in Latin American countries, higher figures of cybervictimization were found in Brazil (8.4% - 58%) and Argentina (14% - 44.2%) and the lowest figures were presented in Peru (11.9%) and Bolivia (11% - 16%) (Garaigordobil et al., 2018). In the aforementioned reviews, the authors covered in their search strategy a time range from 2004 to 2018 and did not report results of studies that incorporated parents, key actors in the prevention and intervention of this phenomenon (Yot-Domínguez et al., 2020).

Several factors are related to cyberbullying including protective factors such as perceived safety in the environment, positive experiences at school, school and social support, family cohesion, authoritative parental

style and parental supervision of ICT use (Buelga et al., 2016; Hong et al., 2018; Silva et al., 2018; Zurcher et al., 2018). On the other hand, having suffered bullying, greater use of social networks, low level of bonding with teachers, poor relationships between peers, dysfunctional family relationships, an authoritarian parental style and parental abuse are configured as risk factors (Duarte et al., 2018; Hong et al., 2018; Zsila et al., 2018; Zurcher et al., 2018).

A large part of these factors is associated with family relationships and the parental role, whose action can influence the reduction of exposure to online risks, mainly through the control of internet access, education and prevention strategies. However, this is a challenge for parents and caregivers, especially for those who do not know well the devices and platforms used by children and adolescents (Cassidy et al., 2012; Marín et al., 2019). Among the parental strategies to prevent their children's participation in cyberbullying is the control of ICT use, however, this action has shown a low impact on the prevention of cyberbullying, since a controlling parental style and inconsistent mediation regarding internet use are associated with greater participation in cyberbullying (Elsaesser et al., 2017; Katz et al., 2019). In addition, collaborative practices, such as mediation, have shown greater effectiveness (Elsaesser et al., 2017).

The role of parents is important in the prevention of cyberbullying from the perspective of teachers and adolescents, highlighting parental supervision and control in the use of ICTs, dialogue with children, strengthening relationships, connection with school and awareness of online risks (Cassidy et al., 2018; Marín et al., 2019). There have been systematic reviews based on quantitative studies on family variables associated with cyberbullying, as risk or protective factors (Elsaesser et al., 2017; Machimbarrena et al., 2019), highlighting important contributions on the role of the family in cyberbullying. These investigations have not incorporated qualitative studies, which allow in-depth exploration of people's perspectives by enabling them to relate their experiences and opinions in their own words (Harcourt et al., 2014; Smith, 2019; Van Manen, 2016). This allows to gather specific information from the perspective of those involved and other relevant actors, significant data for the understanding, intervention and prevention of phenomena such as cyberbullying (Vandebosch & Green, 2019).

In light of the above, the present study analyzes findings from qualitative research that has examined parents' and caregivers' perspectives on

cyberbullying. It seeks to answer the following questions: (1) What are the characteristics of the studies about parents' and caregivers' perspectives on cyberbullying?; (2) What do parents and caregivers know about cyberbullying in children and adolescents?; (3) What are the perspectives and experiences of parents and caregivers regarding cyberbullying prevention and intervention?; (4) What are the suggestions for future research proposed in the studies?

Method

Search and selection strategy

The review followed the PRISMA statement guidelines for systematic reviews and meta-analyses (Moher et al., 2009). A systematic review of the literature published from January 2004 to December 2020 on parent and caregiver perspectives on cyberbullying was conducted. The choice to consider publications in this time range was based on the fact that the first studies on cyberbullying were published in 2004 (Ybarra & Mitchell, 2004; Zych et al., 2015). At first, Boolean terms and their combination were established, defining the following search strategy: (cyberbullying OR cyber-bullying OR online-bullying) AND (parents OR caregivers) AND (perceptions OR beliefs OR conceptualization OR knowledge OR concerns OR views OR understanding). This combination was used to run the search in four electronic databases: Web of Science, Scopus, PsycArticles (APA) and EBSCO. These databases were selected because of their multidisciplinary profile and their peer review process, which evidences the quality of scientific publications and because they contain the majority of journals at the international level (Martín-Martín et al., 2021). The search was performed by two researchers, using titles, abstracts and keywords.

Inclusion criteria

1) empirical studies published in scientific journals; 2) published from January 2004 to December 2020; 3) studies focused on investigating

parents' and caregivers' perspectives on cyberbullying in children or adolescents; 4) use of the qualitative methodology. The option of incorporating only qualitative studies is based on the fact that these can provide a greater understanding of parents' perceptions, opinions, and experiences about cyberbullying (Ghazali et al., 2017; Smith, 2019) and consider participants' voices in describing and interpreting the problem (Creswell & Poth, 2016).

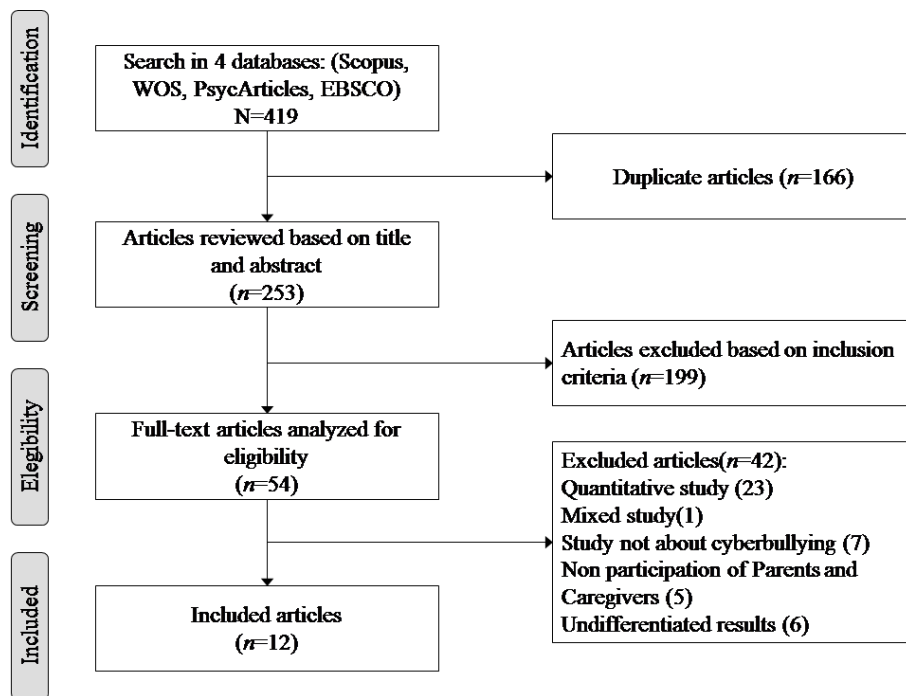
Exclusion criteria

1) studies that presented the perspectives of parents on cyberbullying and school bullying in an undifferentiated manner; 2) studies that presented the perspectives of parents, adolescents, teachers or others involved in an undifferentiated manner; 3) studies that only quantitatively explored parents' knowledge of cyberbullying. It is important to clarify that bullying is recognized as a phenomenon associated with cyberbullying, however, the objective of the present review focused specifically on delving into the phenomenon of cyberbullying.

Search and selection process

The search yielded a total of 419 articles. Duplicate articles (n=166) were identified, the abstracts of the remaining articles (n=253) were reviewed and 199 studies that did not meet the inclusion criteria were excluded. Fifty-four articles were selected for full-text analysis and 12 studies were finally included in the review (see Figure I).

FIGURE I. Study selection flow according to the PRISMA Statement.



Source: Own elaboration.

Data analysis

Based on the principles of thematic analysis (Braun & Clarke, 2006; Thomas & Harden, 2008), as applied in previous studies (Macaulay et al., 2018), the present systematic review used this technique to identify and group the themes of the main findings to represent common patterns across all included studies (Belotto, 2018; Thomas & Harden, 2008). This analytical procedure provided a synthesis of the results.

Results

Characteristics of the studies included in the review

Five studies were conducted in the United States and one in Canada. The others were conducted in different countries, which were located in Australia, Belgium, England, Turkey and Croatia. One of the studies did not report the country where it was conducted. Regarding the participants, three of the studies included only parents and the others included different members of the community (students, teachers and other school professionals, police and pediatricians). It should be noted that only one study included guardians (caregivers or other family members). Therefore, in describing the results, it will refer primarily to parents. The number of participating parents ranged from 10 to 65. Regarding their individual characteristics, only six of the studies reported age, ranging from 25 to 67 years. Regarding gender, eight studies provided the percentage of men and women, with a higher proportion of women, and in two studies, all participants were mothers. Regarding data collection, seven studies conducted focus groups, four used semi-structured interviews and one study applied a questionnaire with open-ended questions (see Table I).

TABLE I. Description of studies on parents' and caregivers' perspectives on cyberbullying in children and adolescents included in the systematic review (n=12)

Authors (year)	Country	Objectives	Participants (n)	Data collection
1. Bollenbaugh et al. (2020)	United States	To explore how parents perceive technology use and their sons/daughters' involvement in cyberbullying as a function of gender.	Parents (48)	Focus groups
2. Broll (2016)	Canada	To examine the types of resources held by parents, schools and police, their position within the cyberbullying safety net, how safety is worked out and the constraints experienced by each group	Parents (14) Educators (12) Police (12)	In-depth interview

3. Compton et al. (2014)	Australia	To examine the views of teachers, parents, and students on the motivation of students who engage in cyberbullying and bullying. To explore their understanding of the definition of both phenomena.	Parents (12) Students (12) Teachers (11)	Focus groups
4. DeSmet et al. (2016)	Belgium	To explore specific parental behavior in the context of cyberbullying using scenarios.	Parents (48)	Questionnaire with open-ended questions in phase 2 of the study.
5. Helfrich et al. (2020)	Not reported	To identify parental protection strategies to prevent their sons/daughters' involvement in cyberbullying and increase young people's ability to cope with cyberbullying	Parents (26)	Focus groups
6. McHugh & Howard (2017)	United States	To explore perceptions of cyberbullying of parents of athletes with disabilities.	Parents (10)	In-depth and semi-structured interview
7. Mehari et al. (2018)	United States	To explore precautionary norms for cyberbullying prevention in youth, parents, and pediatricians and identify barriers to prevention	Parents (15) Adolescents (29) Pediatricians (13)	Semi-structured interview
8. Mid-amba & Moreno (2019)	United States	To examine the similarities and differences between how parents and adolescents view cyberbullying and the role of parents in addressing this phenomenon.	Parents (65) Adolescents (66)	Focus groups
9. Monks et al. (2016)	England	To examine the perceptions of parents/guardians and school staff on cyberbullying among elementary school students.	Parents /tutors (21) Teachers (20)	Focus groups
10 Toraman & Usta (2018)	Turkey	To determine the opinions of high school students and their parents about Internet use and problems occurring on the Internet.	Parents (12) Students (24)	Semi-structured interview
11. Vejmelka et al. (2020)	Croatia	To determine patterns of Internet use and Internet addiction in children and to examine cyberbullying	Parents (20) Children (5) Teachers and caregivers (13)	Focus groups in phase 2 of the study.
12. Young & Tully (2019)	United States	To explore parents' reactions to cyberbullying scenarios and how their responses affirm or contradict guidance on handling their sons'/daughters' involvement in cyberbullying. To compare their responses with those of their sons/daughters.	Parents (48) Adolescents (17)	Focus groups

Source: Own elaboration.

Study findings

The studies provided important information about parents' perspectives on cyberbullying, demonstrating that they are aware of the phenomenon and their opinions are analogous to those of other parents. The topics were grouped as follows: a) Knowledge and use of ICTs by children, adolescents and parents; b) Parental strategies for the prevention of cyberbullying; c) Parental intervention in cases of cyberbullying; d) Motives of children and adolescents for getting involved in cyberbullying situations; e) Barriers to help-seeking by children and adolescents in cyberbullying situations. It is important to note that the differentiation between roles was considered based on the information provided in the studies analyzed. These results are presented in Table II.

TABLE II. Contributions of the included articles to the topics generated in the thematic analysis.

Autores (año)	1	2	3	4	5
1. Bolenbaugh et al. (2020)	X	X	X	X	
2. Broll (2016)			X		
3. Compton et al. (2014)				X	
4. DeSmet et al. (2016)		X	X		X
5. Helfrich et al. (2020)			X		
6. McHugh & Howard (2017)		X			
7. Mehari et al. (2018)	X	X			X
8. Midamba & Moreno (2019)			X		
9. Monks et al. (2016)	X	X		X	
10. Toraman & Usta (2018)			X		
11. Vejmelka et al. (2020)				X	
12. Young & Tully (2019)		X	X		X

Note: 1 = Knowledge and use of ICTs by children, adolescents and parents; 2 = Parental strategies for the prevention of cyberbullying; 3 = Parental intervention in cases of cyberbullying; 4 = Motives of children and adolescents for getting involved in cyberbullying situations; 5 = Barriers to help-seeking by children and adolescents in cyberbullying situations. The contribution of the articles to each topic is marked with X.

Knowledge and use of ICTs by children, adolescents and parents

Parents stated that they think their children use technology excessively (Bolenbaugh et al., 2020), also referring that children and adolescents have greater skills in computer literacy and access to technology, perceiving a generational gap in the competencies associated with ICTs (Monks et al., 2016). Parents noted that their children generally know more about technology and, according to their perception, the most common barrier to cyberbullying prevention was parents' low ICT competence (Mehari et al., 2018).

Parental strategies for the prevention of cyberbullying

The strategies for preventing cyberbullying and cybervictimization noted by parents are communicating and monitoring their children's online activity, maintaining an open and constant line of communication with them and supervising or restricting the content to which they have access. In addition, parents indicated that another strategy used was to encourage positive behavior from cyberbullying witnesses and to build trust in their children (Helfrich et al., 2020). Monitoring and supervision of ICT use were strategies that consistently recurred in the responses of parents and guardians, along with the use of rules and restrictions (Mehari et al., 2018; Monks et al., 2016). Parents prioritize rules as an element of prevention, recognizing that their children require constant monitoring (Young & Tully, 2019), especially when they have a disability since this would make them more vulnerable to cybervictimization (McHugh & Howard, 2017). Another interesting aspect of the parents' account is that the responsibility for monitoring is often interfered with by the parental burden on them, which, in conjunction with the lack of knowledge about cyberbullying, leads them to experience feelings of frustration (Bolenbaugh et al., 2020).

Parental intervention in cases of cyberbullying

Parents stated that they should play a protective role and help their children to escape cyberbullying when they are victimized and, in

the case that they were aggressors, give sanctions. In addition to the sanctions as an immediate solution, they recognize that it is necessary to understand how their children relate to others on social networks in order to become effective allies in addressing the problem (Bolenbaugh et al., 2020). In the same vein, Young and Tully (2018) explored parents' reactions to hypothetical scenarios where they envisioned their children in the roles of cyberaggressor, cybervictim, or cyberwitness. In the first place, when the parents imagined their children as victims, they showed an attitude aimed at protecting them, but this also depended on who was involved and the context of the aggression. Secondly, conceiving their children as aggressors generated great concern for them since this could indicate that their children were moving away from the values developed at home. In addition, the majority indicated that they would apply for a sanction (give punishment), but the need to have an open conversation was recognized. Thirdly, visualizing their children as witnesses, parents indicated that they could advise them to express support for the victim, but not to confront the aggressor, balancing concern for their children's safety with guidance to support others.

Regarding support needs, parents indicate that resources, guidance and strategies focused on the prevention and intervention of cyberbullying are required (Midamba et al., 2019) since, according to them, reducing the prevalence of this phenomenon is the only way to protect their children (DeSmet et al., 2016). Moreover, parents can also take other types of measures when their children are cybervictims, such as reporting the situation on the social networks involved, taking legal action (Toraman & Usta, 2018) or seeking professional help from psychologists, pediatricians or other professionals (Helfrich et al., 2020). On the other hand, Broll's (2014) study indicated that parents of adolescents who had been cybervictims or cyberaggressors reported their desire to deal with cyberbullying on their own without the help of other groups. This is because in past experiences they were disappointed by the responses of other people responsible for the safety of their children, such as teachers or police officers, which led them to independently seek solutions or discuss cyberbullying incidents with the parents of those involved.

Motives of children and adolescents for getting involved in cyberbullying situations

Among the reasons that drive children and adolescents to engage in cyberbullying as aggressors, parents mention anonymity, the use of technology, the avoidance of retaliation (Compton et al., 2014), previous participation in bullying situations (Monks et al., 2016) and the normalization of violent behaviors through the internet (Vejmelka et al., 2020). On the other hand, they have the perception that girls and adolescents tend to engage more in cyberbullying in the role of aggressor and normalize certain behaviors, which can also configure a motive to be cybervictimized as well (Bolenbaugh et al., 2020; Vejmélka et al., 2020).

Barriers to help-seeking by children in situations of cyberbullying

Parents recognize the importance of cybervictims being able to seek external help, either by reporting cyberbullying situations at school or by informing their family (Mehari et al., 2018). In the same vein, they refer that it is necessary to educate their children regarding the duty of not ignoring cyberbullying when they witness it, providing containment to their peers, taking positive action and informing adults (DeSmet et al., 2016). Regarding potential barriers to cybervictims deciding to seek help or report their cyberbullying experiences, parents suggested fear of repercussions (Mehari et al., 2018), the perception of cyberbullying as normal, and the idea that parental intervention is not necessary (Young & Tully, 2019).

Suggestions for future research presented in the reviewed studies

The studies suggest that future research could incorporate parents from different ethnic backgrounds and socioeconomic levels (Bolenbaugh et al., 2020), highlighting the importance of developing cross-cultural research (DeSmet et al., 2016). Larger-scale studies with parents and guardians, primary and secondary school students, and educational establishment staff are suggested, exploring their perceptions of cyberbullying, allowing

everyone to participate in the dialogue and planning of cyberbullying prevention and intervention strategies (Cassidy et al., 2018; Compton et al., 2014; Helfrich et al., 2020; Monks et al., 2016; Toraman & Usta, 2018). There are other important actors in the intervention, detection or prevention of cyberbullying, highlighting primary health care professionals, with whom it is suggested to carry out future research exploring larger samples and diverse contexts (Mehari et al., 2018). On the other hand, there is a need to explore the cyberbullying safety net, of which institutional members in charge of safety, parents and staff of educational establishments can form part. Future studies should also consider informal and criminal responses to cyberbullying (Broll, 2014).

Suggestions also point to future studies incorporating among their variables the motives of children and youth who perpetrate cyberbullying (Compton et al., 2014) and parental supervision and support as a protective factor against the risks of the cyber world (Vekmelka et al., 2020). Moreover, research presenting hypothetical scenarios to participants could use gender-neutral pronouns, to avoid the gender variable influencing the responses of parents or other participants (Bolenbaugh et al., 2020). Finally, it is also suggested to develop future research on cyberbullying in adolescents with intellectual disabilities incorporating bullying perpetrated by peers, teachers, and even siblings. In addition, it is important to evaluate the effectiveness of support using infographics and other types of visual support to help children and adolescents recognize when they are being cyberbullied and an adult needs to be notified (McHugh & Howard, 2017).

Discussion and conclusions

This study aimed to systematize qualitative research on the perspectives of parents and caregivers about cyberbullying. After searching the Scopus, Web of Science, PsycArticles and EBSCO databases and analyzing the 12 selected articles, it was found that only one of the studies included other family members or guardians in addition to parents. This information evidences the need to conduct studies with this population. This is needed since caregivers and guardians have fundamental role in the prevention and intervention of this phenomenon. Moreover, the results indicate that parents have perspectives and opinions about different important

aspects of cyberbullying, highlighting knowledge and use of ICTs, parental strategies for prevention and intervention, children's motives for involvement in cyberbullying situations, and barriers to seeking help.

The findings of the reviewed studies show that parents are aware of the phenomenon and their opinions are similar to those of other parents. One element present in most of their accounts is the identification of a generation gap in terms of ICT use. Parents and guardians perceive that they are at a disadvantage, arguing that their children are more tech-savvy (Bolenbaugh et al., 2020; Mehari et al., 2018; Monks et al., 2016). This can make it difficult for parents to be aware of their children's online activities, a situation that constitutes a risk factor (Barlett & Fennel, 2018). Preventing cyberbullying is a complex task for parents and the characteristics of the cyber world make this task difficult, as it constantly offers new platforms, applications and ways of communicating online that they do not know or understand, which can hinder supervision (Elsaesser et al., 2017; Goldstein, 2015).

Parents report that they use various strategies to prevent and intervene in cyberbullying situations. In terms of prevention, they show a preference for monitoring and supervising their children's online activity and maintaining open and constant communication with them (Helfrich et al., 2020; Mehari et al., 2018; Monks et al., 2016; Young & Tully, 2019). The above result is consistent with the literature, where it is evident that parents tend to use two types of prevention strategies. The first type is restrictive ones that include monitoring or limiting the use of the Internet or technological devices and the second one collaborative strategies, where mediation, education, communication, strengthening family relationships and linking school and family stand out (Cassidy et al., 2018; De la Caba et al., 2013; Elsaesser et al., 2017). At this point, it is important to consider that parents can control and limit the use of technology and online activity of their children, however, these measures can affect the relationship with them, making it distant (Baldry et al., 2019). In the same line, parental monitoring has great influence as a protective factor for involvement in risky behaviors on the Internet, since most cyberbullying situations occur when children and adolescents are at home (Buelga et al., 2016).

When their children are victims of cyberbullying, parents recognize that they need to protect and support them and to do so they need to understand their interactions on social networks and other virtual

platforms (Bolenbaugh et al., 2020; Midamba et al., 2019). Parents report using sanctioning actions as immediate solutions, but in the long term, they prioritize positive bonding (Cassidy et al., 2012). It is important to have positive and open communication between parents and their children (Moreno et al., 2019) because when communication is scarce and conflictive, they tend to avoid sharing with their parents the difficult circumstances they experience, situation that causes parents to be unaware when their children are involved in cyberbullying (Buelga et al., 2016). It is relevant to point out that parents who participated in the studies did not report information about overlapping of roles, since different opinions and possible actions emerged in the case of their children being aggressors, victims or witnesses. However, the studies did not explore their perspectives on possible situations in which their children were involved in cyberbullying from more than one role (Barlińska et al., 2013; Ferreira et al., 2016; Mishna et al., 2012).

On the other hand, it has been evidenced that parental control through the establishment of restrictions and supervision configures a protective factor against cyberbullying (Álvarez-García et al., 2019). When their children are victims of cyberbullying, parents sometimes also take other types of measures, such as reporting the situation on the social networks involved, establishing legal actions (Toraman & Usta, 2018) or seeking help from professionals (Helfrich et al., 2020). However, Broll's (2014) research revealed that parents of adolescents who had been victims or aggressors might also decide to deal with cyberbullying on their own without seeking help, due to past negative experiences, where they have not received support. Parents play a central role in preventing and intervening in cyberbullying situations, therefore, they should be encouraged to be aware of and show interest in their children's online activities (Cerna et al., 2016; Moodley & Singh, 2016). In addition, they raised the need for support in understanding the risks of the cyber world and guidance on the most effective strategies to deal with cyberbullying by implementing programs that address that need (Hutson et al., 2018).

Among the motives of children and adolescents for engaging in cyberbullying, parents and guardians mention anonymity, the impact of technology, avoiding retaliation (Compton et al., 2014) and previous experiences of bullying (Monks et al., 2016). Other motives include escape from the real world and compensation for lack of social skills, desire for revenge, and intent to harm, variables that have been

extensively studied in conjunction with cyberbullying (Navarro et al., 2018; Tanrikulu & Erdur-Baker, 2019). Parents' knowledge of their children's motivations for engaging in cyberbullying is extensive and is consistent with the literature, which indicates that adolescents' motives for engaging in cyberbullying may be power, anonymity, boredom, or access to technology (Yot-Dominguez & Fernandez, 2020).

Regarding seeking help from children and adolescents, parents identify fear of repercussions in the case of victims (Mehari et al., 2018) and the normalization of cyberbullying as barriers (Young & Tully, 2019). Consistent with this, the literature indicates that perceived harm in cyberbullying and active mediation increases the likelihood of help-seeking (Cerna et al., 2016). Moreover, adolescents show a preference for addressing cyberbullying on their own, and justifications for this decision include ignorance or underestimation of the negative consequences of cyberbullying and fear of adult overreactions, including restriction of internet access (Gao et al., 2016). Adolescents often report cyberbullying to their peers rather than to adults, and many even prefer not to report it. To counteract this situation, adolescents should be educated about the importance of their role as witnesses and parents and other significant adults should be educated about how to support the involved children (Brandau et al., 2019; DeSmet et al., 2016).

Regarding the limitations of this review, it is important to mention that we did not incorporate studies included in books or unpublished research (grey literature) and did not include Spanish-language databases in the search, sources that could have provided more information. The present review focused only on parents' and caregivers' perceptions of cyberbullying and a limitation derived from this decision is the exclusion of articles that dealt only with traditional bullying considering that both phenomena are widely related. Additionally, only one of the studies of this review included caregivers, so it was not possible to analyze their perspectives on the phenomenon in depth.

Based on what was reported in the analyzed studies, it is suggested that future research on cyberbullying with parents be conducted considering the various sociodemographic factors, such as socioeconomic levels, other ethnic backgrounds, and the individual characteristics of the children, such as intellectual ability or sexual and/or gender orientation. It is also suggested that future research that presents participants with hypothetical scenarios or cases employ gender-neutral pronouns. The perspectives of

parents, caregivers, and others involved on role overlap in cyberbullying need to be studied. It is suggested to explore parents' and caregivers' knowledge, experiences, coping strategies, and intervention measures in both cyberbullying and traditional bullying. It is necessary to investigate the role of the different actors involved in the phenomenon, including children, parents, caregivers, teachers and other members of educational establishments, primary health care professionals and professionals in the area of public safety. Finally, it is essential to incorporate families in cyberbullying prevention and intervention programs, so future studies should consider their experiences, opinions and needs.

In conclusion, the main findings of the studies included in this review address the knowledge and use of ICTs by parents and their children, parental strategies for prevention and intervention of the phenomenon, their children's motives for engaging in cyberbullying, and barriers to seeking help. These results provide guidelines for an educational-preventive action that promotes parental knowledge of their children's new forms of social interaction and effective intervention. The family plays a fundamental role in the prevention and intervention of cyberbullying, so it is necessary to continue carrying out research involving these actors. Therefore, it is important to know their opinions regarding the phenomenon, how they are intervening and their needs and suggestions so that they can also promote the healthy coexistence of their children with their peers in a face-to-face and online context.

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Social support, socio-emotional competencies and cybervictimisation: a longitudinal analysis among primary school students¹

Apoyo social, competencias socioemocionales y cibervictimización: estudio longitudinal en estudiantes de Educación Primaria

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Abstract

Cyberbullying is a serious social and health problem for children. Cyberbullying behaviours occur among peers at school, affecting day-to-day life in the classroom, and are reported among students in the final years of primary education. This study analyses the relationships between social support from friends, socio-emotional competencies and cybervictimisation in early

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adolescence (10-13 years old). A short-term longitudinal design (two assessments with a six-month interval) was used. The final sample comprised 566 students in Years 5 and 6 at primary school in the Madrid and Castilla-La Mancha regions (Spain). Students provided self-reports on cyberbullying and bullying frequency (T1 and T2), social support from friends and socio-emotional competencies (T1). At the end of the academic year, cybervictimisation was found to be stable. The results showed that being a cybervictim at the end of the academic year was significantly associated with being a cyberperpetrator and victim of bullying in the same period. Participants with stronger social support from friends and socio-emotional competencies at the start of the academic year (T1) were less likely to experience cybervictimisation at the end of the academic year (T2). In conclusion, the results point to the importance of detecting cyberbullying and promoting early intervention by schools. Socio-emotional competencies and social support from friends are relevant strategies for preventing cyberbullying. Teachers and other educational actors outside schools should work to improve socio-emotional competencies among children in order to foster positive relationships between them.

Keywords: cyberbullying, social support, socio-emotional competencies, school bullying, longitudinal, early adolescence

Resumen

El ciberacoso es un grave problema social y para la salud de los menores. Los comportamientos de ciberacoso se producen entre los compañeros de la escuela por lo que también afectan al desarrollo diario de la vida en el aula. La cibervictimización aparece en los últimos cursos de Educación Primaria por lo que consideramos que el último ciclo de Educación Primaria es un periodo fundamental de intervención y de prevención. En el presente estudio se analiza la relación del apoyo social de los amigos, las competencias socioemocionales y la cibervictimización en la adolescencia temprana (entre los 10 y los 13 años). Se realizó un diseño longitudinal a corto plazo (dos evaluaciones con 6 meses de diferencia). La muestra fue de 566 estudiantes de 5º y 6º de Educación Primaria de las comunidades de Madrid y Castilla-La Mancha (España). Los estudiantes informaron sobre los comportamientos de victimización y de perpetración de ciberacoso y de acoso escolar (T1 y T2); el apoyo social de los amigos y las competencias socioemocionales (T1). Se constata la estabilidad de la cibervictimización. Ser cibervíctima al final del curso está significativamente asociado con ser ciberperpetrador y víctima de acoso escolar en el mismo periodo. Los menores con mayor apoyo social de los amigos y con más competencias socioemocionales en el inicio del curso (T1) presentan menos probabilidad de experimentar cibervictimización al final del curso (T2). En conclusión, estos datos ponen de manifiesto la necesidad de detectar el ciberacoso e intervenir

tempranamente en las escuelas. Las competencias socioemocionales y el apoyo social de los amigos son estrategias relevantes de intervención y prevención de la cibervictimización. Los maestros, junto con los agentes educativos externos a la escuela, deben fomentar las dinámicas socioemocionales en el grupo social de los menores para fomentar las relaciones de convivencia.

Palabras clave: ciberacoso, apoyo social, competencias socioemocionales, acoso escolar, estudio longitudinal, adolescencia temprana

Introduction

School bullying has been defined as an intentional act of aggression perpetrated by a group or individual on a recurrent basis over a period of time against a victim who cannot easily defend themselves (Smith et al., 2008). It is a serious social issue with a significant impact on children's health (Garaigordobil, 2011). When information and communication technologies (ICT) are used to carry out this bullying, it is known as cyberbullying (Smith et al. 2008). Kowalski et al. (2012a) define cyberbullying as an intentional, aggressive, repeated behaviour exercised by a more powerful individual over a more vulnerable person using new technologies. Cyberbullying differs from traditional bullying in aspects such as the anonymity of perpetrators and the potentially far greater audience (Slonje, & Smith, 2008),

A number of studies carried out in Spain have reported cyberbullying among students in the final years of primary education (Delgado, & Escortell, 2018; García-Fernández et al., 2017; Machimbarrena, & Garaigordobil, 2018). Although they remain lower than school bullying rates, cybervictimisation rates in primary schools (García-Fernández et al., 2017; Machimbarrena, & Garaigordobil, 2018) stand at between 7% (Cross et al., 2015) and 13.8% (Machimbarrena, & Garaigordobil, 2018). Some studies have observed higher levels of cybervictimisation among boys than girls (García-Fernández et al., 2015), others have found no significant differences (Monks et al., 2012; Navarro et al., 2016), and others still have found higher levels of cybervictimisation among girls (Delgado, & Escortell, 2018). Experiences of cybervictimisation begin at

primary school, so the final stage of primary education (from age 10) is considered a key period for intervention and prevention.

Temporal stability of victimisation

Longitudinal studies have demonstrated the existence of stable victims, or victims who remain in this role over time. Stability refers to the repetition and consistency of a student's victimisation over a specific period of time, which can range from months to years (Rueger et al., 2011), even if it is not perpetrated by the same individual (Pouwels et al. 2016).

Most studies have examined the stability of victimisation in school bullying during the transition from primary to secondary school. The stability of school bullying during this period is around 10% (Oncioiu et al., 2020; Zych et al., 2020). In a meta-analysis of 77 longitudinal studies, Pouwels et al. (2016) found that stability was lower during primary education. Meanwhile, Hellfeldt et al. (2018) studied 3,347 students from 44 primary schools and found that 1.6% were ongoing victims of school bullying. They observed no differences by gender. With regard to cyberbullying, Jose et al. (2012) conducted a longitudinal study of 1,700 students aged 11-16 over a two-year period and found a lower stability of cyberbullying than school bullying among adolescents. However, few studies have specifically analysed the stability of cyberbullying (Gonzalez-Cabrera et al., 2021) and we are not aware of any that specifically analyze the stability of cyberbullying during the final two years of primary education. Therefore, it is necessary to analyse the stability of cybervictimisation during this period in children's education.

Simultaneity of bullying and cyberbullying and overlap between victimisation and perpetration

Several studies conducted in different countries have observed simultaneous bullying and cyberbullying in all age groups, with perpetrators and victims extending (or alternating) their roles from the real to the virtual world or vice versa (Evangelio et al., 2022; Kowalskiet al., 2012b).

Participation in school bullying and cyberbullying, as a victim and a perpetrator, has been identified as a risk factor for cybervictimisation (del Rey et al., 2012; Fanti et al., 2012; Sticca et al., 2013). However, research data on the influence of school bullying as an explanatory factor for cyberbullying are not conclusive (García-Fernández et al., 2016). Other studies have found no evidence of this relationship (Raskauskas, & Stoltz, 2007; Slonje, & Smith, 2008).

Meanwhile, research has shown a positive relationship between victimisation and perpetration (Mitchell et al., 2011; Zhou, et al., 2020), identifying an overlap between the two roles, although the causal relationship remains unclear (Fanti et al., 2012). With regard to cyberbullying, the results of a study by Li (2007) indicate that the best predictor of cybervictimisation is cyberperpetration. It is also likely that cybervictims will become cyberperpetrators (del Rey et al., 2012; Sticca et al., 2013). Longitudinal studies have found stronger correlations between cybervictimisation and cyberperpetration as the period between measurements progresses (Chu et al., 2018; Pabian, & Vandebosch, 2016). Lozano et al. (2020) performed a meta-analysis of 22 research studies, finding that adolescents tend to be cybervictims before becoming cyberperpetrators.

Therefore, it is important to conduct longitudinal research to analyse the relationship between bullying and cyberbullying and between the roles of victim and perpetrator. Research is particularly crucial during the stage of primary education when these behaviours begin to emerge.

Risk factors linked to cybervictimisation

According to socio-ecological theory (Bronfenbrenner, 1977), victimisation through cyberbullying is likely to originate and continue over time as the result of interaction between personal and social factors (Cross et al., 2015; Fanti et al., 2012).

One of these personal factors is socio-emotional competencies, which constitute resources and strategies for positive social relationships (Collaborative for Academic Social, and Emotional Learning, 2018). Students with strong socio-emotional skills have proven to be good at communicating, negotiating conflicts in a constructive manner and seeking help when necessary, as well as demonstrating socially

responsible behaviour (DeLay et al., 2016; Wang et al., 2019). A number of studies have shown that socio-emotional competencies could protect against cyberperpetration (Romera et al., 2017; Zych et al., 2018; Zych et al., 2019), but the effect of socio-emotional competencies on cybervictimisation remains unclear (Beltrán-Catalán et al., 2018). Several studies have identified weak socio-emotional competencies among cyberbullying victims (Gómez-Ortiz et al., 2017), while others have found no significant differences in socio-emotional competencies between students who do not participate in cyberbullying and victims (Romera et al., 2016; Zych et al., 2018).

With regard to social factors, research has suggested that social support from friends is negatively associated with school bullying and cyberbullying in adolescence (Katzner et al., 2009; Yubero et al., 2010). In early adolescence, several authors have highlighted the importance of analysing bullying in the context of friendships at school (Mishna et al., 2008; Wei, & Jonson-Reid, 2011). Young teenagers tend to attach more importance to their friendships and develop more exclusive relationships with their friends (Pronk, & Zimmer-Gembeck, 2010), turning to them as their main source of support (Holfeld, & Leadbeater, 2017). However, the relationship between cyberbullying and the role of friends remains unclear (Fanti et al., 2012). Whereas Navarro et al. (2015) report that cybervictims at primary school tend to have weak social support and few friends, Mishna et al. (2016) found no association between social support and cybervictimisation.

These contradicting results and the lack of studies with primary school students point to the need for more in-depth analysis of the relationship between cyberbullying, social support from friends and cybervictimisation. It is important to identify the factors that make primary school cybervictims vulnerable so that adequate prevention measures can be taken and they can be equipped with coping strategies.

Study objectives

The first study objective was to analyse the prevalence of stable cybervictimisation in the final years of primary education. In this regard, stable cybervictimisation is expected (H1) to occur throughout the

academic year in the final years of primary education (Hellfeldt et al., 2018).

The second study objective was to analyse cybervictimisation in relation to experiences of school bullying and cyberbullying, socio-emotional factors and social support from friends. Based on previous studies, we expect to find longitudinal relationships between victimisation through cyberbullying at the end of the academic year and victimisation through cyberbullying at the start of the academic year (T1, stability of cyberbullying, Jose et al., 2012), and transversal relationships with involvement as cyberperpetrators (T2, overlapping of roles, Li, 2007) and victimisation through school bullying (T2, simultaneity, Evangelio et al., 2022). It is also anticipated that children with stronger socio-emotional competencies (Gómez-Ortiz et al., 2017) and greater social support from friends (Navarro et al., 2015) (T1) will be less likely to be cybervictims at the end of the academic year (H2).

Methodology

Design and participants

A longitudinal study was carried out during a single academic year using two measures: time 1 at the start of the academic year (October-November, T1) and time 2 at the end of the academic year (May-June, T2). A total of 1,130 students completed the questionnaire in full in T1, while 735 (65%) did so in T2. The participants were students in Years 5 and 6 at public primary schools in two regions in central Spain: Madrid (48.7%) and Castilla-La Mancha (51.3%). 44.4% of the sample lived in urban areas (towns with more than 10,000 inhabitants) and 55.6% were attending schools in rural environments (villages with fewer than 10,000 inhabitants).

Of the 13 schools that participated in T1, 5 refused to participate at the end of the academic year. A total of 566 students (50% of the original sample), who completed every item on the questionnaire on both times, were included in the study. 48.6% of the participants were girls, with ages ranging from 10 to 13 years old ($M= 10.82$, $SD= 0.74$), and 52.9% were in Year 5.

Measures

To measure school bullying and cyberbullying, the Spanish version (Rodríguez-Álvarez et al. (2021) of the *Bullying Harassment and Aggression Receipt Measure (Bullybarm*, Hall, 2016) was used. The measure comprises 14 Likert-type items for each dimension of perpetration and victimisation, with four response options from 0 to 3 (0=Not in the past month, 1=1 or 2 times in the past month, 2=About 1 time a week, and 3=About 2 or more times a week). Students were asked to evaluate the frequency of their participation in different behaviours throughout the last month. The measure provides information about school bullying (physical, verbal and social, 11 items, e.g. 'I was called a bad name' or 'A false rumour was spread about me') and cyberbullying (3 items, e.g. 'A mean comment was made about me on the internet'). It is important to note that the questionnaire did not provide information about the elements of intentionality or power imbalance that would constitute victimisation through bullying. The instrument displayed adequate reliability in recent studies with adolescents (Larrañaga et al., 2018). The internal consistency, measured using Cronbach's α , was .88 in T1 and .78 in T2 for victimisation through school bullying, .66 in T1 and .73 in T2 for cybervictimisation; .79 in T1 and .82 in T2 for perpetration of school bullying, and .67 in T1 and .77 in T2 for cyberperpetration.

The score was dichotomised according to the same criteria as previous studies (Sticca et al., 2013). Participants who obtained a score exceeding 1 in at least one of the victimisation through school bullying and cyberbullying items were classified as victims of bullying and cyberbullying respectively. The same criteria were applied to perpetration.

To evaluate perceived social support from friends, the friends dimension of the AFA-R measure was used (González, & Landero, 2014). It contains seven Likert-type items (e.g. 'I trust my friend(s) to talk about things that worry me') with five response options from 1 to 5: 1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Always. The score is the sum of the items, ranging from 7 to 35 points. The higher the score, the greater the student's social support. This subscale displayed adequate reliability in recent studies with adolescents (Fernández-Zabala et al., 2020). In this study of primary school students, the consistency of the subscale was also high ($\alpha=.89$).

Socio-emotional competencies were measured using the *Delaware Social Emotional Competencies Scale–Student* (DSECS-S, Mantz et al. 2018), which has already proved suitable for use with primary school students (Yang et al., 2020). The DSECS-S collects information on four dimensions: responsible decision-making, relationship skills, self-management and social awareness. It contains 12 items (e.g. ‘I am good at solving conflicts with others’ and ‘I feel responsible for how I act’), which students must respond to using a Likert-type scale from 1=Never to 4=Always. The internal consistency coefficient measured using Cronbach’s α was .79.

Procedure

For ethical reasons, informed consent was first sought from the children’s legal guardians. 0.9% of the families in T1 and 3.5% in T2 did not respond, so their children did not participate in the data collection for the corresponding period.

The questionnaire was administered by the children’s teachers, with support from members of the research team. It was administered in the classroom with authorisation from the school headteachers and teachers. Students were informed that participation was voluntary and their answers would remain anonymous. The approximate mean response time was 30 minutes in T1 and 15 minutes in T2 (only *Bullybarm* was used in the second time). The study met all Spanish and international ethical standards, including the Helsinki Declaration and personal data protection laws. The project was approved by the Ethics Committee at Hospital Virgen de la Luz (PI0519).

Data analysis

The data were processed using the statistical programme SPSS. Firstly, the percentage of cybervictimisation in T2 and T1 was calculated, analysing the differences using McNemar’s test. The stability of cybervictimisation was analysed using a contingency table and the chi-squared test. The relationship between sex and cybervictimisation was evaluated using the chi-squared test. To study the relationship between the variables, the

degree of association between them was calculated for T1 and T2 by sex using Pearson's correlation coefficient. Cohen's proposal (1988) was used for the interpretation: around $r=0.1$ represents a small effect; around 0.3 is medium, and around 0.5 is large. A multiple linear regression was then carried out. Victimization through cyberbullying in T2 was used as the dependent variable. Sex was introduced as a control variable. In all cases, the probability of making a Type I error of $p \leq .05$ was used to consider a result statistically significant.

Results

In the final measure (T2), 6.1% ($n= 34$) of the students had been victimised at least once via one of the forms of cyberbullying analysed. With regard to sex, no significant differences were found ($\chi^2= 0.28, p= .363$): 5.6% of boys ($n= 16$) and 6.7% of girls ($n= 18$) reported cybervictimisation.

In the initial measure (T1), 8.8% ($n= 49$) of the students reported being victimised at least once via one of the forms of cyberbullying analysed. With regard to sex, no significant differences were found here either ($\chi^2= 0.13, p= .416$): 8.4% of boys ($n= 24$) and 9.3% of girls ($n= 25$) reported cybervictimisation. The prevalence of cybervictimisation was similar in both periods ($p= .072$).

Although the prevalence was similar at the start and end of the academic year, this was not the case for all cybervictimised students: some managed to escape the cyberbullying they had suffered at the start of the year ($n= 38$) and others became cybervictims at the end of the academic year ($n=23$), while cybervictimisation was a constant in some children's school experiences (stable cybervictims).

22% of the cybervictims in T1 reported also being cybervictims in T2. This means that 2% ($n= 11$) of the sample reported stable cybervictimisation, cybervictimisation in T1 and cybervictimisation in T2 ($\chi^2= 25.71, p<.001$). Therefore, 32.4% of the victims of cyberbullying in T2 were also victims of cyberbullying in T1. With regard to sex, no significant differences were found ($\chi^2= 1.04, p= .792$): 4% of boys ($n= 4$) and 7% of girls ($n= 7$) reported stable cybervictimisation.

The correlations between the study variables were analysed for Time 1 and Time 2 (see Table 1). Table 1 shows that, among the boys, the Pearson's correlation coefficient was not significant for the relationship

between cybervictimisation in T1 and T2. Stable victimisation was only found in bullying ($r = .57$). The relationship was significant for the overlapping of roles (cybervictimisation/cyberperpetration: $r = .70$) and for simultaneity of victimisation through bullying and cyberbullying ($r = .32$). A small effect was observed in the relationship between support from friends and cybervictimisation ($r = -.17$). Among the girls, a medium effect was observed in Pearson's correlation coefficient for stability of cybervictimisation ($r = .40$), overlapping of roles ($r = .36$) and simultaneity of victimisation through bullying and cyberbullying ($r = .26$). The relationships between cybervictimisation and social support from friends ($r = -.22$) and cybervictimisation and socio-emotional competencies ($r = -.20$) were also significant, with a medium effect size. The result for stability of victimisation was higher for bullying ($r = .57$). Among both sexes, the correlation between social support from friends and socio-emotional competencies was significant (Boys: $r = .39$; Girls: $r = .49$).

TABLE I. Correlations between study variables by sex

	VBT1	VCT1	PBT1	PCT1	VBT2	VCT2	PBT2	PCT2	SSF	SES
VBT1	--	.55***	.51***	.19***	.57***	.00	.23***	.04	-.10	-.27**
VCT1	.36***	--	.19**	.36***	.27***	.02	-.01	-.00	.00	-.01
PBT1	.59***	.23***	--	.36***	.35***	.02	.48***	.12*	-.00	-.36***
PCT1	.12*	.27***	.12*	--	.20***	-.03	.05	.04	-.02	-.12
VBT2	.63***	.23***	.33***	.03	--	.32***	.42***	.25***	-.16*	-.13*
VCT2	.19***	.40***	.14*	.41***	.26**	--	.34***	.70***	-.17*	.01
PBT2	.42***	.22***	.59***	.12*	.36***	.18**	--	.62***	-.00	-.17*
PCT2	.02	.18**	-.01	-.01	.06	.14*	.36***	--	.04	-.02
SSF	-.08	-.12*	-.07	-.06	-.07	-.22**	-.06	-.04	--	.39***
SES	-.15	-.10	-.32***	-.01	-.02	-.20**	-.17*	-.09	.49***	--

Nb. The values for the boys are above the line, while those below the line correspond to the girls. VBT1 = Victimisation Bullying T1, VCT1 = Victimisation Cyberbullying T1, PBT1 = Perpetration Bullying T1, PCT1 = Perpetration Cyberbullying T1, VBT2 = Victimisation Bullying T2, VCT2 = Victimisation Cyberbullying T2, PBT2 = Perpetration Bullying T2, PCT2 = Perpetration Cyberbullying T2, SSF = Social Support from Friends, SES = Socio-Emotional Skills. * $p < .05$; ** $p < .01$; *** $p < .001$

Source: compiled by the authors

To estimate the protective capacity of social support from friends and socio-emotional competencies against cybervictimisation in T2, a

linear regression analysis was performed (Table 2). The results showed a significant association with both variables (Social support from friends: $\beta=-0.83$, $p<.05$, Socio-emotional competencies: $\beta= -.041$, $p<.05$) and their interaction ($\beta= -1.06$, $p<.05$). The results also showed an association between cybervictimisation in T2 and cybervictimisation in T1 ($\beta= 0.19$, $p<.01$), and with the variables of cyberperpetration ($\beta= 0.48$, $p<.001$) and victimisation through bullying ($\beta= .029$, $p<.001$) in T2. The resulting model proved significant and explained 33% of the variance.

TABLE 2. Linear regression to identify predictors of cybervictimisation in T2

	β	t	p	CI 95%
Sex			.236	
Victimisation Bullying T1	0.07	1.19	.256	-0.04 – 0.16
Perpetration Bullying T1	-0.09	-1.14	.051	-0.03 – 0.01
Victimisation Cyberbullying T1	0.14	1.96	.005	0.00 – 0.06
Perpetration Cyberbullying T1	0.19	2.84	.981	0.06 – 0.32
Victimisation Bullying T2	-0.00	-0.02	.000	-0.25 – 0.25
Perpetration Bullying T2	0.29	4.24	.288	0.02 – 0.05
Perpetration Cyberbullying T2	-0.10	-1.06	.000	-0.06 – 0.02
Socio-Emotional Competencies			.034	
Social Support from Friends	-0.41	-2.13	.040	-0.90 – -0.03
Socio-Emotional Competencies x Support from Friends	-0.83	-2.07	.037	-0.82 – -0.02
	-1.06	-2.09		-0.80 – -0.25
Nagelkerke R ²	.33			
F	11.04***			
df	11			

Nb: β = standardised coefficient; t = Student's t; p= significance; CI 95% = confidence interval; df= degrees of freedom; ***p<.001
Source: compiled by the authors

Discussion

Cyberbullying is an important social issue due to its impact on children's health and education (Garaigordobil, 2011; Li, 2007; Ybarra et al., 2007). The study of factors associated with experiences of cybervictimisation plays a central role in designing strategies to tackle the issue in schools. Few studies have provided longitudinal data on predictors of victimisation through cyberbullying among primary school students. In this study, the

participants were students in Years 5 and 6 of primary education, who completed the questionnaire at the start and end of an academic year.

For some children, victimisation at primary school can mark the start of a history of victimisation throughout their academic lives (Hellfeldt et al. 2018; Lozano et al., 2020). The main aim of this study was to analyse the prevalence of stable cybervictimisation in the final years of primary education. The results confirmed the stability of cybervictimisation among primary school students over the course of an academic year (H1), with 2% of victims reporting stable cybervictimisation. No differences were observed by sex. A significant correlation of .36 was also found between cybervictimisation in T1 and T2, corroborating the findings of Giesbrecht et al.'s (2011) study of adolescents. This is the first research study to specifically analyse the temporal stability of cybervictimisation over the course of an academic year among primary school students.

Online victimisation at the start of the academic year was a strong predictor of cybervictimisation six months later (H2). This finding is reinforced by previous research focusing on a broader sample of age groups (Jose et al., 2012; Zych et al., 2020). It demonstrates the need for immediate intervention to address cyberbullying as it emerges to prevent ongoing victimisation via ICT tools.

Prior research with adolescents has found that participation in school bullying (del Rey et al., 2012; Fanti et al., 2012; Sticca et al., 2013) and cyberperpetration (Li, 2007) are risk factors for victimisation through cyberbullying. However, in our study of primary school students, neither involvement in traditional school bullying as victims or perpetrators nor cyberperpetration in T1 were related to cybervictimisation in T2. This difference between stages may be explained by the changes occurring in children's approaches to friendship as they grow older. According to routine activities theory (Cohen et al., 1981), the victim's appeal can increase the likelihood of victimisation. If the bully loses interest in the victimised student, previous incidents of bullying may lose their value as a predictor. Moreover, in preadolescence, friendship groups are beginning to form and cognitive decentration prompts young people to understand friendship in terms of cooperation and reciprocal support (Fuentes, & Melero, 1993), leading to instability in relationships between peers according to their assessment of these variables. Similarly, bullies may assess their peers and view them as easy targets depending on their degree of support from friends.

The results of this study show that the roles of cybervictim and cyberperpetrator can overlap (H2). In line with other studies (Chu et al., 2018; Pabian, & Vandebosch, 2016) of primary school students, the correlation between cybervictimisation and cyberperpetration was stronger at the end of the academic year (T2) than at the beginning (T1). According to Lozano et al. (2020), children who are cybervictims and feel powerless to escape online bullying may become cyberperpetrators in an attempt to defend themselves. Among primary school students, cyberperpetration occurs primarily through WhatsApp (García-Fernández et al., 2015), which removes the perpetrators' anonymity; in turn, this loss of anonymity can transform them into victims. This is a relevant consideration for intervention, as longitudinal studies have shown that students who are both cybervictims and cyberperpetrators are more likely to suffer depression and anxiety than their classmates (Lozano et al., 2020). When the victims are aggressive themselves, they are less likely to receive support from their classmates, allowing victimisation to continue (Sugimura et al., 2017).

The results of the study also confirmed the simultaneity of cybervictimisation and victimisation through school bullying at the end of the academic year. This points to the relationship between schools and cyberbullying, which should be taken into consideration when designing strategies for prevention and intervention. According to Kowalski et al. (2021b), in primary and secondary school students, the role of the victim extends from cyberspace into the real world. This is relevant when it comes to intervention, as studies have shown that students who are polyvictimised are more likely to suffer reduced wellbeing than their classmates (Lozano et al., 2020).

In this study, it was expected that social support from friends and socio-emotional competencies would act as protective factors against cybervictimisation (H2). The findings support this hypothesis: children with greater social support from friends and stronger socio-emotional competencies at the start of the academic year (T1) had a lower likelihood of experiencing cybervictimisation at the end of the year (T2).

Other studies, such as Mishna et al. (2016), found no association between social support and cybervictimisation. The significant relationship observed in this study may be due to the fact that rising internet use among children has also increased support from friends online, serving as a protective factor against cyberbullying. Interpersonal

relationships offline are maintained in online environments (Ortega-Ruiz et al., 2014), so social support from friends via a social network may also protect against becoming a victim (Eliot et al., 2010). The findings of this study echo those of research by Schoeps et al. (2018) with secondary school students, which shows a reduction in the longitudinal incidence of cybervictimisation in students aged 12-15 following the implementation of a programme to develop socio-emotional skills.

The interaction between the two factors (socio-emotional competencies and social support) corroborates previous research, which has shown that students with strong socio-emotional competencies tend to seek help to resolve conflicts (DeLay et al., 2016; Wang et al., 2019). In this quest for assistance, support from friends can contribute to constructive negotiation between peers to resolve conflict and reduce cybervictimisation.

Educational implications

Despite its online nature, cybervictimisation is a key issue for schools. Research has demonstrated the importance of schools in fighting school bullying in the final years of primary education, as students transition to secondary education (Coffey, 2013; Waters et al., 2012). However, the fact that cyberbullying occurs outside school premises and hours (Hinduja, & Patchin, 2012) has led some to argue that schools and teachers have little responsibility for intervening to prevent it (Englander, 2012).

This study indicates that early adolescence, from the age of 10, is a key period in preventing cyberbullying. It is important to adopt a short and long-term approach to the issue, as the results of this study show that cybervictimisation can become stable over time.

The findings of this study emphasise the importance of educational intervention to develop socio-emotional competencies and social support. In early adolescence, friendships tend to emerge primarily within children's class groups (Larson, & Verna, 1999) and face-to-face social relationships from school are transferred online (Mikami et al., 2010). Therefore, strengthening social relationships between classmates can help increase social support, prevent the emergence of cyberbullying (Zych et al, 2021) and establish friendships. Of course, friendships between students are neither the school's nor the teacher's responsibility, but they can promote positive interaction between students in the classroom in

the hope of encouraging new personal relationships. Parents also play an important role in offering opportunities for students to gather and build friendships (Marande et al., 2014).

It is also vital to bring an end to inadequate conflict resolution strategies based on aggression, which give rise to a vicious circle of perpetrators and victims (Navarro et al. 2018). Developing socio-emotional competencies can equip children with the social and emotional skills they need to establish positive relationships and address conflict in an appropriate manner. Primary education is a crucial stage in the development of socio-emotional competencies, as relationships with classmates become more important to children at this time (Rueger et al., 2011).

Providing teachers with sufficient resources to prevent cyberbullying between students is a priority. Actions that enhance socio-emotional development and encourage positive social relationships can help prevent cyberbullying. It is essential that these actions are backed by social actors from outside the school environment to encourage children to develop healthy relationships. Several experiments using reading to boost socio-emotional development and social support have been carried out (see, for example, García-Bacete et al., 2013). This appears to be a helpful intervention strategy, as reading offers the potential for activities to be carried out in classroom libraries, in partnership with school or public libraries (Sánchez-García, & Yubero, 2015). It also encourages collaborative work with parents and creates social spaces for gathering, which can facilitate the establishment of new relationships.

Limitations

There are several limitations to this study. Experimental mortality was high at 50%, although this is similar to the levels reported in other longitudinal studies (e.g. González-Cabrera et al., 2021). In our study, 5 of the 13 schools that participated in T1 refused to participate at the end of the academic year. At one school, the headteacher had changed; at the others, one or more of the teachers involved declined to participate in the second phase, so the whole school's participation was cancelled to avoid internal conflicts.

Another limitation is that only three items were used to measure cyberbullying. Measurements of the prevalence of cyberbullying depend

on the instrument used to study it (Cross et al., 2015; Romera et al., 2016). Nevertheless, the measure of cyberbullying used in this study encompasses all the main types of cyberbullying considered relevant at this age (Smith et al., 2008). It is important to note that the study only considered types of bullying and provides no information as to their intensity. It also fails to take the power imbalances and elements of intentionality inherent to bullying into consideration. Future studies should employ broader measures of cyberbullying. Coelho and Marchante (2018) have shown that poor socio-emotional competencies are more of a consequence than a cause of participation in cyberbullying. In a study of marginalised students, socio-emotional competencies and experiences between peers were shown to influence one another (García-Bacete et al., 2021). This points to the need for studies using mediation analysis to obtain a more in-depth understanding of these complex relationships. The findings could also be supplemented by a specific analysis of the dimensions of socio-emotional competencies that are associated with cybervictimisation. With regard to social support, another limitation is that the study overlooks other sources of support such as parents or teachers.

Conclusion

This study offers new data about cybervictimisation in primary school students. Firstly, the results confirm the temporal stability of cybervictimisation. Two in ten primary school students suffer cyberbullying throughout the academic year.

The study also found evidence of the association between cybervictimisation at the start of the academic year (T1) and being a cybervictim six months later (T2), but no association was found with previous involvement in school bullying. Cybervictimisation at the end of the academic year was also found to be associated with simultaneity of school bullying and cyberbullying and with overlap in the roles of cybervictim and cyberperpetrator (T2).

Socio-emotional competencies and social support are protective factors against cybervictimisation among primary school students. Children with greater social support from friends and stronger socio-

emotional competencies at the start of the academic year (T1) were less likely to experience cybervictimisation at the end of the year (T2).

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Class-level effects on cybervictimization in secondary students: A multilevel analysis

Efecto del grupo-clase sobre la cibervictimización en estudiantes de Secundaria: un análisis multinivel

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Abstract

Introduction: Cyberbullying is a complex phenomenon that has significant consequences for the victims. Understanding it requires a systemic-ecological approach, aiming to identify both individual and contextual predictors. During adolescence, peer group influence becomes particularly important, especially the influence of classmates, who spend much of their time together. The main objective of this study was to analyze the possible effect of group-class characteristics on the probability of being the victim of cyberbullying, controlling for the effects of personal variables, in a sample of adolescents in

Asturias (Spain). For this purpose, we first determined possible variability in cybervictimization between group classes, along with the effects of personal variables in the sample examined. Method: Self-report scales were administered to 1923 secondary school students (aged 12-18). Multilevel regression analysis was performed. Results: There were differences in cybervictimization between classes, with 5% of the variance explained by group-class variables. A positive relationship was found between cybervictimization and the following student variables: age, social anxiety, engaging in high-risk behaviors on the internet, being the victim of traditional violence at school, and being a cyberaggressor. The group-class variables that had a positive relationship with cybervictimization were the average level of cyberaggression and the average level of traditional victimization in the group, even when controlling for the effects of personal variables. Discussion: It is important to develop students' social skills, including working on peer group dynamics, promoting support and friendship networks, offering guidance on safe, responsible use of the internet, and promoting empathy and pro-victim responses to bullying that is witnessed or known about. The importance of these variables as indicators for early detection of the problem is highlighted.

Keywords: cybervictimization, adolescence, Secondary Education, predictors, multilevel.

Resumen

Introducción. La cibervictimización es un fenómeno complejo, con importantes consecuencias para quien la padece. Para su comprensión, es necesario un enfoque sistémico-ecológico, tratando de identificar no sólo predictores individuales, sino también contextuales. Durante la adolescencia cobra particular importancia la influencia del grupo de iguales y, dentro de ellos, los compañeros de clase, con los que comparten gran parte de su tiempo. El objetivo principal de este estudio ha sido analizar el posible efecto de características del grupo-clase sobre la probabilidad de cibervictimización, controlando el efecto de variables individuales, en una muestra de adolescentes de Asturias (España). Para ello, previamente se analizó si existía variabilidad en cibervictimización entre los grupos-clase; y el efecto de las variables individuales, en la muestra analizada. Metodología. Se aplicaron escalas de autoinforme a 1923 estudiantes de Educación Secundaria Obligatoria (12 a 18 años). Se realizaron análisis de regresión multinivel. Resultados. Se hallaron diferencias en cibervictimización entre las clases, explicadas en un 5% por las variables de grupo-clase. Entre las variables referidas al estudiante, se obtuvo una relación positiva de la edad, la ansiedad social, las conductas de riesgo en Internet, ser víctima de violencia escolar tradicional y ser ciberagresor, con la cibervictimización. Entre las variables de grupo-clase, el nivel promedio en el grupo tanto de ciberagresión

ejercida como de victimización en violencia escolar tradicional, mostraron una relación positiva con la cibervictimización, incluso controlando estadísticamente el efecto de las variables individuales. **Discusión.** Importante desarrollar en el alumnado habilidades sociales; trabajar las dinámicas de grupo, promoviendo redes de apoyo y amistad; ofrecer pautas para el uso seguro y responsable de Internet; y trabajar la respuesta empática y a favor de la víctima ante agresiones conocidas o presenciadas. Se destaca asimismo la importancia de estas variables como indicadores para la detección temprana del problema.

Palabras clave: cibervictimización, adolescencia, Educación Secundaria, predictores, multinivel.

Introduction

Cybervictimization is a complex phenomenon with important consequences for those who suffer from it (Marciano et al., 2020). In order to understand it, we must adopt a systemic-ecological approach, trying to identify not only individual factors that influence its appearance, but also contextual ones. In this sense, during adolescence, the influence of the peer group and, within it, the group of classmates with whom adolescents share much of their time, not only inside but, in many cases, also outside the classroom, becomes particularly important.

Research on the risk factors for peer cyber-victimization in adolescence has focused primarily on the analysis of *individual variables*. The most analyzed variable has been *sex* but with inconsistent results (Kowalski et al., 2014). In general terms, the relationship between sex and cybervictimization is weak and complex, depending on the age and context of the sample, and the type of cyberaggression analyzed. Thus, in Spanish adolescents, Álvarez-García, Barreiro-Collazo et al. (2017) found no differences between boys and girls in most types of cybervictimization analyzed and, in those that did present differences, they were small: boys tended to suffer more aggressions in online gaming environments, while girls suffered more rumors on social networks or sexual cyberaggression.

Other individual variables show a clearer relationship with the likelihood of being a victim of cyberaggression in adolescence. Meta-analyses indicate that *age*, *low self-esteem*, *social anxiety*, *risky Internet*

behaviors, being *a victim of traditional violence in the school setting*, and being *a cyberaggressor* increase the likelihood of being a victim of cyberaggression (Kowalski et al., 2014; van Geel et al., 2018). *Antisocial behavior* also increases that probability (Garaigordobil, 2017).

However, as indicated, *contextual factors* must also be taken into account. Among the contexts with the greatest impact on the development of the adolescent's personality is their peer group and, within it, their classmates. However, the *group class* has hardly been studied as an explanatory context of cybervictimization among adolescents. So far, there is very little research on the variability of cyber-victimization between group classes and its comparison with individual variability within groups or about the effect of variables related to the group class in the likelihood that the students in it will become victims of cyberaggression.

Concerning the variability of cybervictimization between group classes, to our knowledge, only Festl et al. (2015) offered data, indicating that 5% of the cybervictimization in their sample could be attributed to the class context. In Spain, only the study of Gámez-Guadix and Gini (2016) offered data in this line, although referring to performed cyberaggression: the classes explained 8% of the variance in cyberbullying performed by the students.

Regarding the possible effect of variables related to the group class, a variable that some studies indicate affects the probability of being a victim of aggression, is the *size of the group*. Although contrasting results have been found (Menesini & Salmivalli, 2017), some studies have indicated that, in large groups, it is more likely to be a victim both of traditional school violence (Khoury-Kassabri et al., 2004) and cyberaggression (Heirman et al., 2015). In fact, being *a victim of traditional violence* in the school environment and being a victim of cyberaggression are closely related (Beltrán-Catalán et al., 2018). Although cyberaggression occurs predominantly outside the school, it can originate from situations experienced in the physical environment, sometimes in the school environment. Some studies conclude that cybervictimization among adolescents is more likely among students in the same class (Wegge et al., 2014) and that the larger the size of the group, the more likely it is that there will be one or more students in it who perform cyberaggression (Festl et al., 2015).

Other factors related to the group class with possible impact on cybervictimization have to do with the dynamics of the peer group.

Peer influence shows a significant and robust effect on a wide variety of behaviors (externalizing, internalizing, and academic behaviors) in adolescence (see Giletta et al., 2021, for a recent meta-analysis of longitudinal studies). In this sense, a negative school climate and a negative influence of peers increase the probability that a student in the group will be a victim of cyberaggression (Guo, 2016). In groups in which students justify or even reinforce aggressions between peers, the probability of aggressions occurring increases and, therefore, the levels of victimization also increase (Saarento et al., 2015). More specifically, Gámez-Guadix and Gini (2016) found in a Spanish sample that the degree to which classmates justify cyberbullying is a risk factor for cyberbullying behaviors in the students in the group over time. Therefore, in groups where peers show a higher level of *antisocial behavior* or, in particular, a higher level of *traditional aggression* in the classroom or *cyberaggression*, a student will be more likely to be a victim of cyberaggression.

Continuing with the factors at the group class level, adolescents who carry out cyberbullying tend to perform more risky Internet behaviors (Gámez-Guadix et al., 2016) and present poorer academic performance (Kowalski, & Limber, 2013). Therefore, it can be expected that in group classes in which there are more *risky Internet behaviors* and worse *academic performance*, there will be more cyberaggressions and, therefore, also more cybervictimization. Among the few studies in this line, Heirman et al. (2015) found that the proportion of students above the normative age for the group class (i.e., repeating students) is positively associated with the degree of cyberbullying among students belonging to that same class.

Given the social, educational, and clinical relevance of the problem and the scarcity of studies that analyze the effect of group class variables, the present work had three objectives. The main objective was to analyze the possible effect of group class characteristics in the probability of cybervictimization, controlling for the effect of individual variables, in a sample of adolescents from Asturias (Spain). For this purpose, the variability in cybervictimization between the group classes and the effect of the individual variables in the target sample were previously analyzed.

The following hypotheses were proposed. First, we expected to find variability in the average frequency of cybervictimization between group classes, with the characteristics of the group explaining a small but significant part of the variance (around 5%, in accordance with

previous evidence). Secondly, we expected that the students' individual characteristics would explain these differences. In line with previous evidence, sex was expected to have a weak but significant relationship with the degree of cybervictimization, and age, low self-esteem, social anxiety, risky Internet behaviors, being a victim of traditional violence in the school environment, antisocial behavior, and being a cyberaggressor would increase the likelihood of being a victim of cyberaggression. Finally, concerning the main objective of this study, which constitutes its main novelty and contribution, in accordance with prior evidence, we expected that the size of the group class, as well as the percentage of repeaters, risky Internet behaviors, traditional victimization, traditional aggression, cyberaggression, and antisocial behavior in the group would increase the probability of cybervictimization.

Method

Participants

Participants in the study were 1923 students (48.8% girls) of Compulsory Secondary Education (CSE) in Asturias (Spain), aged between 12 and 18 years ($M = 14.01$, $SD = 1.38$). They belonged to 97 group classes, from 11 schools (six public and five concerted), randomly selected from among the publicly funded schools of Asturias in which CSE is taught. In each selected school, all CSE students who presented informed consent from their parents or guardians were evaluated.

Instruments

Sociodemographic variables. Participants were asked about their age (open question) and sex (dichotomous question: male/female).

School variables: We asked the tutor of each group how many students were in the group (group size), as well as how many repeater students were in the course.

Self-esteem. The respondents completed a self-report scale composed of five items (e.g., “I like the way I am”) (Álvarez-García et al., 2015). Responses are rated on a 4-point Likert scale ranging from 1 (*Totally false*) to 4 (*Totally true*). The total score of the scale was obtained by adding the scores of its items, with higher scores reflecting high self-esteem. The internal consistency of the scale scores in the sample of this study was adequate ($\alpha = .742$).

Social anxiety. To determine the extent to which respondents felt inhibited and uncomfortable in their relationships with others, especially with people with whom they are not familiar, a five-item self-report scale was used (e.g., “I get nervous when I have to be with a group of kids I don’t know well”) (Álvarez-García et al., 2015). Responses are rated on a 4-point Likert scale ranging from 1 (*Totally false*) to 4 (*Totally true*). The total score of the scale was obtained by adding the score of its items, with higher scores reflecting high levels of social anxiety. The internal consistency of the scores in the sample of this study was adequate ($\alpha = .751$).

Traditional victimization at school. To know the frequency with which the respondent reported suffering from aggressions at school during the last three months, the Offline School Victimization scale (Álvarez-García et al., 2015) was used. It is a six-item self-report (e.g., “My classmates make fun of me, and laugh at me”), rated on a 4-point Likert scale, ranging from 1 (*Never*) to 4 (*Always*). The total score on the scale is obtained by adding the score of its items, with higher scores reflecting high levels of offline victimization at school. The internal consistency of the scale scores in the sample of this study was adequate ($\alpha = .744$).

Traditional aggression at school. To know the frequency with which the respondent admits performing traditional aggressions at school, we employed a scale previously used by the research team (Álvarez-García et al., 2016), with the same number of items (six), the same indicators and type of response as the Offline School Victimization scale (e.g., “I’ve laughed at and made fun of a classmate”). The total score on the scale was obtained by adding the score of its items, with higher scores reflecting high levels of offline aggression at school. The internal consistency of the scores in the sample of this study was adequate ($\alpha = .757$).

Antisocial Behavior. To determine the extent to which the respondent admits performing antisocial behaviors, we applied a 6-item scale, adapted from some items of the *Scale of Antisocial and Criminal Behavior in Adolescents* of Andreu and Peña (2013) (e.g., “I have entered private property without permission”). The response format is dichotomous (Yes/No), indicating whether or not the action was carried out over the past year. The internal consistency of the scores in the sample of this study was adequate (KR20 = .741).

Risky Internet Behaviors. To determine the extent to which the respondent performs risky behaviors on the Internet, we used the *High-Risk Internet Behaviors Questionnaire* (Álvarez-García et al., 2018). It is an eight-item self-report, each of which describes a risky Internet behavior (e.g., “I habitually publish personal information on my social networks: what I’m going to do, where, and with whom; personal or family photos or videos; etc.”). The respondent rates each of the statements on a 4-point Likert scale ranging from 1 (*Completely false*) to 4 (*Completely true*). The total score on the scale was obtained by adding the scores of its items. High scores indicate high engagement in risky Internet behaviors. The internal consistency of the scores in the sample of this study was adequate ($\alpha = .758$).

Cybervictimization. The *Cybervictimization Questionnaire for Adolescents* (CYVIC, Álvarez-García, Núñez et al., 2017) was used to determine the frequency with which the respondent reported having been a victim of aggression through the mobile phone or the Internet during the three months prior to the survey. It consists of 19 items, which measure verbal cybervictimization, visual cybervictimization, impersonation, and online exclusion. The response format is a 4-point Likert scale ranging from 1 (*Never*) to 4 (*Always*). The total score was calculated by adding the scores of its items. High scores indicate high levels of cybervictimization. The internal consistency of the scale was adequate ($\alpha = .781$).

Cyberaggression. The *Cyberaggression Questionnaire for Adolescents* (CYBA) (Álvarez-García et al., 2016) was used to determine the frequency with which the respondent admitted having performed aggressions

through the mobile phone and the Internet during the three months prior to the survey. It consists of 19 items, with the same indicators and response format as the CYVIC. The total score of the scale is calculated by adding the scores of its items. High scores indicate high levels of cyberaggression. The internal consistency was ($\alpha = .830$).

Procedure

After the sample and the measuring instruments had been selected, permission was requested from the school directors to apply the questionnaires. Each board of directors was informed of the goals and procedures of the study, its voluntary and anonymous nature, and the confidential treatment of the results. Once the school had agreed to participate, informed consent was sought from the students' parents or guardians if they were minors. Before completing the questionnaire, students were also informed of the anonymous, confidential, and voluntary nature of their participation. The questionnaires were applied by the research team during school hours. In general, the students had 20 minutes to complete the questionnaires, although this was flexible depending on the age and characteristics of the students.

Data analysis

Given the explanatory objective of the study and the hierarchical nature of the data (group class and students nested in the group classes), we used a two-level hierarchical regression procedure to analyze the refined effect of each variable by statistically controlling for the effect of the rest. The following process was used:

1st step: Unconditional means model

First, the null or unconditional means model (which does not include any explanatory variables) was adjusted, where Y_{ij} is the observed cybervictimization for the i th student nested in the j th class, γ_{00} is the global average cybervictimization of the students, u_{0j} is the variability between classes in terms of the students' average cybervictimization, and

e_{ij} is the variability in the cybervictimization of the students nested in the j th class. It is assumed that the random terms of the model are normally and independently distributed with a mean of zero and constant variance.

2nd step: Models with class level predictors

The unconditional means model does not contemplate the characteristics of the students or the classes but only provides a basis on which to compare more complex models. However, cybervictimization could be explained by the characteristics of the students who make up the classes, the characteristics of the classes, as well as the conjoint effect of both of them. Therefore, after confirming that the average cybervictimization was higher in some classes than in others, we sought the reason for this difference. For this purpose, a new analysis was carried out, incorporating seven explanatory variables recorded at the class level (Level 2) and centered on the general mean: class size (CS), percentage of repeaters in the class (REP_GR), average traditional aggression of the students in the class (AGR_GR), average traditional victimization of students in the class (VIC_GR), average cyberaggression of students in the class (CBA_GR), average antisocial behavior of the students in the class (AB_GR), and average risky Internet behaviors by students in the class (RB_GR). The last four variables were obtained from the individual scores of the students in each group and were incorporated into this Level 2, as they offer a measure of the contextual climate of behavior and internet use among the students of the group.

We started by formulating at Level-2 the conditional model, $Y_{ij} = \gamma_{00} + \gamma_{01}CS_j + \gamma_{02}REP_GR_j + \gamma_{03}RB_GR_j + \gamma_{04}VIC_GR_j + \gamma_{05}AGR_GR_j + \gamma_{06}CBA_GR_j + \gamma_{07}AB_GR_j + u_{0j} + e_{ij}$, where γ_{00} is the average cybervictimization when all predictors are zero; γ_{01} to γ_{07} is the effect of each explanatory variable while controlling for the effect of the rest; u_{0j} is the conditional or residual variation between classes; and e_{ij} is the variation within them. Subsequently, a simplified model was analyzed, in which only the variables that showed a significant effect were included.

3rd step: Models with student-level predictors

The model formulated in the previous section did not contemplate the students' characteristics. Thus, we could not know why there are

differences in students' cybervictimization, nor was there evidence that the variability observed between classes was not an artifact due to the different profiles of the students nested within the classes. To answer this question, a new analysis was carried out incorporating eight explanatory variables recorded at the student-level (Level 1): sex (SEX), antisocial behavior (AB), age (AGE), self-esteem (S-E), social anxiety (SA), Risky Internet behaviors (RB), traditional victimization in the school environment (VIC), and cyberaggression (CBA). Except for sex, the remaining variables were centered on the mean of their group. In the model specified in this section, we not only postulate that a student's score in cybervictimization is related to risky Internet behaviors and cyberaggression but, after evaluating whether each of the slopes of any of the explanatory variables at the student-level had a component of significant between-group variance, we also postulate that this relationship would not be identical in all classes.

The resulting conditional model of random intersections and slopes at Level-1 can be written as follows: $Y_{ij} = \gamma_{00} + \gamma_{10}SEX_{ij} + \gamma_{20}AB_{ij} + \gamma_{30}AGE_{ij} + \gamma_{40}S-E_{ij} + \gamma_{50}SA_{ij} + \gamma_{60}RB_{ij} + \gamma_{70}VIC_{ij} + \gamma_{80}CBA_{ij} + u_{0j} + u_{1j}RB + u_{2j}CBA + e_{ij}$, where Y_{ij} refers to the observed cybervictimization for the i th student nested in the j th class; γ_{00} represents the average cybervictimization of classes across the class population; γ_{10} to γ_{80} denotes the relationship between each explanatory variable and the average cybervictimization, controlling for the effect of the other explanatory variables included; and u_{1j} and u_{2j} indicate whether the relationship between the average cybervictimization and the variables "risky behaviors" and "cyberaggression" varies across classes.

4th step: Models with predictors at the student-level and the class-level

After separately adjusting a model for the individual variables and one for the class-level variables, we considered a model containing variables from both levels. As no cross-interaction effects were found between the variables of different levels, they were not included in the model, which was as follows: $Y_{ij} = \gamma_{00} + \gamma_{01}VIC_GR_j + \gamma_{02}CBA_GR_j + \gamma_{10}AGE_{ij} + \gamma_{20}SA_{ij} + \gamma_{30}RB_{ij} + \gamma_{40}VIC_{ij} + \gamma_{50}CBA_{ij} + u_{0j} + u_{1j}RB + u_{2j}CBA + e_{ij}$. That is, cybervictimization can be considered as a function of the general average fixed effects, the main effects of the explanatory variables included, plus the random effects that represent the variability between intersections

(u_{0j}), between slopes (u_{1j} , u_{2j}), and between students within the classes (e_{ij}).

Data analysis was performed using the MLM implemented in the PROC MIXED module of the SAS v.9.4 program (SAS Institute, Inc., 2020).

Results

Variability in cybervictimization between classes

Table 1 shows the results of the unconditional means model. The estimate of the average cybervictimization in this sample of classes differed from zero. There were statistically significant differences in the levels of cybervictimization both within classes and between classes. In 95% of the cases, the magnitude of the variation in average cybervictimization between classes could be expected to be within the range. This indicated a moderate to low range of variability in the levels of cybervictimization between the classes in this sample of data. In turn, about 95% of the variance observed in cybervictimization occurred within the classes, while the remaining 5% occurred between classes.

TABLE I. Results of the unconditional model of means

Fixed effects					
Parameter	Estimator	Standard Error	df	t Ratio	Pr > t
Intercept	21.5908	0.1075	96	200.86	<.0001
Random effects					
Covariance parameter		Estimator		Z	Pr > Z
Class average		0.4968		3.00	.0014
Level-I Effect		9.3573		26.76	<.0001
Model fit information for cybervictimization					
Description		Value			
Deviance		7836.5			
AIC		7842.5			
BIC		7050.2			

Note. df = degrees of freedom; Deviance = -2 Log Likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

Effect of class characteristics on the degree of cybervictimization

When adjusting the initial conditional model of random intersection with Level-2 predictors (Model A), no statistically significant effect was observed for group size, percentage of repeaters, risky Internet behaviors in the group, average traditional aggression at school performed in the group, and average antisocial behavior of the group (Table 2). Therefore, a second model (Model B) was tested, without these variables. The statistical deviance and the number of parameters estimated for models A and B were 7444.4 (10) and 7448.6 (5), respectively. The likelihood ratio test, which compares the deviance of Model B with that of Model A, indicated that there were no significant differences between the two models, $\chi^2(5) = 11.07, p = .5209$. In the simplified model, there was a positive and highly significant association both of average traditional victimization at school in the group, and of average cyberaggression performed in the group, with average cybervictimization. The classes that differ by 1 point in both variables differ by around 0.5 points in cybervictimization.

TABLE 2. Results of the conditional model of random intersection with multiple Level-2 predictors

Model A					Model B				
Fixed effects									
Parameter	Estimator	SE	df	Pr> t	Estimator	SE	df	t Ratio	Pr> t
Intercept	21.1587	0.4526	89	<.0001	21.5799	0.0774	94	278.91	<.0001
CS	0.0181	0.0187	89	.3355					
REP_GR	0.0018	0.0057	89	.7507					
RB_GR	0.0852	0.0593	89	.1547					
VIC_GR	0.5340	0.1123	89	<.0001	0.4550	0.0949	94	4.80	<.0001
AGR_GR	-0.2080	0.1353	89	.1278					
CBA_GR	0.5143	0.1004	89	<.0001	0.4906	0.0685	94	7.16	<.0001
AB_GR	0.0758	0.2035	89	.7105					
Random effects									
Covariance parameter	Estimator	SE	Z	Pr> Z	Estimator	SE	Z	Pr> Z	

Class average	0				0.1001	0.0835	0.11	.4547
Level-1 Effect	9.1515	0.3305	27.89	<.0001	9.1717	0.3315	27.69	<.0001
Model fit information for cybervictimization								
Description	Value				Value			
Deviance	7744.4 (10)				7748.6 (10)			
AIC	7762.4				7756.7			
BIC	7758.6				7767.0			

Note: CS = Class size; REP_GR = Percentage of repeaters in the class; RB_GR = Risky Internet Behaviors, class average; VIC_GR = Traditional victimization at school, class average; AGR_GR = Aggressor of traditional school violence, class average; CBA_GR = Cyberaggression_class average; AB_GR = Antisocial_behavior, class average; SE = Standard error; df = degrees of freedom; Deviance = -2 Log Likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

The variance corresponding to Level 2 was substantially reduced after incorporating the predictor variables “traditional victimization at school, group average” and “cyberaggression performed, group average”. Specifically, whereas the unconditional variance was 0.497, the conditional variance was 0.10. This indicates that around 80% of the variability observed in the average cybervictimization was explained by the main effects reported. Thus, the significant variation in the intersections disappeared after controlling for these two variables; in fact, the residual intraclass correlation was .01, indicating that about 1% of the variation in cybervictimization was between classes.

Effect of student characteristics on the degree of cybervictimization

Table 3 shows the main results obtained after adjusting three models of intersections and random slopes with multiple predictors of the student-level (Level 1). According to the likelihood ratio test, which compares the deviance of the simplified Model B with the deviance of the initial Model A, there were no significant differences between the two models, $\chi^2(3) = 3, p = .3916$, so the simplest model (Model B) was chosen. Next, we compared the model in which the intersections but not the slopes varied across classes (Model C) with the model in which both the intersections and the slopes varied (Model B). The likelihood ratio test revealed statistically significant differences between Models B and C, $\chi^2(5) = 91.8, p < .0001$. In addition, Model B presented the lowest AIC and BIC values. Therefore, we selected Model B.

TABLE 3. Results of random intersection and slope models with multiple Level-I predictors

	Model A			Model B			Model C		
Fixed Effects									
Parameter	Estimator	SE	t Ratio	Estimator	SE	t Ratio	Estimator	SE	t Ratio
Intercept	21.5179	0.1294	166.24	21.6093	0.1127	191.68	21.6059	0.1110	194.69
SEX	0.1810	0.1252	1.45						
AB	0.1015	0.0566	1.79						
AGE	0.2400	0.0900	2.67	0.2646	0.0890	2.97	0.2891	0.0923	3.13
S-E	-0.0013	0.0236	-0.05						
SA	0.0445	0.0179	2.48	0.0439	0.0171	2.57	0.0483	0.0179	2.69
RB	0.0713	0.0219	3.26	0.0794	0.0217	3.66	0.0813	0.0172	4.72
VIC	0.3669	0.0266	13.81	0.3640	0.0259	14.06	0.3697	0.0269	13.75
CBA	0.4554	0.0434	10.50	0.4698	0.0424	11.09	0.4502	0.0253	17.83
Random Effects									
Covariance parameter	Estimator	SE	Z	Estimator	SE	Z	Estimator	SE	Z
Class mean	0.8812	0.1960	4.50	0.8776	0.1958	4.48	0.7914	0.1865	4.24
RB-CBV	0.0167	0.0058	2.70	0.0162	0.0059	2.74			
CBA-CBV	0.0831	0.0212	3.81	0.0835	0.0219	3.80			
Level-I Effect	5.1025	0.2018	25.29	5.1128	0.2022	25.29	5.8446	0.2194	26.64
Model fit information for cybervictimization									
Description	Value			Value			Value		
Deviance	7069.0 (16)			7074.0 (13)			7165.8 (8)		
AIC	7101.0			7100.0			7181.8		
BIC	7142.2			7133.5			7202.4		

Note: SEX = Sex; AB = Antisocial behavior; AGE = Age; S-E = Self-esteem; SA = Social anxiety; RB = Risky Internet Behaviors; VIC = Traditional victimization in the school environment; CBA = Cyberaggression; CBV = Cybervictimization. SE = Standard Error; Deviance = -2 Log Likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion;

The first conclusion after adjusting Model B is that, on average, there was a positive and statistically significant relationship between the explanatory variables age, social anxiety, risky Internet behaviors, traditional victimization at school, and performed cyberaggression with the cybervictimization scores within the classes. Concerning the predictors whose slopes were not fixed, we note that, on average, there was a statistically significant relationship within the classes between

cybervictimization and the variables risky behaviors and cyberaggression ($\gamma_{06} = 0.079, p = .0003; \gamma_{08} = 0.469, p < .0001$). Adolescents who make less secure use of the Internet tend to suffer more aggressions through this medium than those who make more responsible use. Something similar can be said of the relationship between the aggressions performed and the aggressions suffered. In addition, the results also show that, although the effects of the variables “risky behaviors” and “cyberaggression” were constant for all the adolescents within the classes, they varied significantly between classes.

The second notable aspect is that there were highly significant differences between the 97 school averages ($Z = 4.48, p < .0001$), a result quite similar to that found in the unconditional means model. In other words, the classes differed in average cybervictimization levels after controlling for the effects of the explanatory variables. The inclusion of these variables in the student level accounted for 45% $[(9.36 - 5.11)/9.36]$ of the variation within the classes. Finally, we rejected the null hypothesis that stated that the slopes would not differ across the classes ($Z = 4.74, p = .0010; Z = 3.80, p = .0010$). Thus, we can infer that the relationship between the variables risky Internet behaviors and cybervictimization in the classes varied significantly between the classes. The same goes for the relationship between the variables cyberaggression and cybervictimization.

Joint effect of class and student characteristics on the degree of cybervictimization

Table 4 shows the main results obtained after adjusting the model that includes Level-1 and Level-2 predictors. The average traditional school victimization in the group was positively related to the average cybervictimization, controlling for the effect of the average perpetrated cyberaggression. The average perpetrated cyberaggression was positively related to the average cybervictimization of the group, controlling for the effect of the average traditional school victimization in the group. The previously found statistically significant relationship of age, social anxiety, risky Internet behaviors, traditional victimization at school, and cyberaggression performed by the student with cybervictimization was maintained.

TABLE 4. Results of the combined model of random intersections and slopes

Fixed effects					
Parameter	Estimator	SE	df	t Ratio	Pr> t
Intercept	21.5756	0.0703	94	307.02	<.0001
VIC_GR	0.4171	0.0758	94	5.50	<.0001
CBA_GR	0.5319	0.0550	94	9.67	<.0001
AGE	0.2765	0.0880	1431	3.14	.0017
SA	0.0432	0.0170	1431	2.54	.0113
RB	0.0784	0.0215	1431	3.65	.0003
VIC	0.3602	0.0257	1431	14.02	<.0001
CBA	0.4855	0.0416	1431	11.68	<.0001
Random effects					
Covariance parameter		Estimator			
Class average		0.1501			
CR-CBV		0.0160			
CBA-CBV		0.0801			
Level-I Effect		5.3037			
Model fit information for cybervictimization					
Description		Value			
Deviance		6962.0			
AIC		6992.0			
BIC		7030.6			

Note. VIC_GR = Traditional victimization in the school environment, class average; CBA_GR = Average cyberaggression in the class; AGE = Age; SA = Social anxiety; RB = Risky Internet Behaviors; VIC = Traditional victimization in the school environment; CBA = Cyberaggression; CBV = Cybervictimization. SE = Standard Error; df = degrees of freedom; Deviance = -2 Log Likelihood; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion.

We conclude the Results section, highlighting two aspects related to the random effects. On the one hand, the variance component for intersections remained significantly different from zero ($Z = 2.11, p = .0170$), suggesting that there is additional variation between the average cybervictimization levels of the classes that is not explained by the factors included in the final model. Thus, there is reason to believe that there are additional factors at the class level that could explain the variation in class averages. However, a very substantial reduction in the

variance of class averages was observed after controlling for the variables “risky Internet behaviors” and “cyberaggression” because, whereas the unconditional variance of the intersections was 0.87, the conditional variance of the final model was 0.15. On another hand, the interpretation of the variance components referring to the slopes is very similar to that given for the student-level adjusted model. That is, the relationship between the average cybervictimization and the variables risky behaviors and cyberaggression varied across classes ($Z = 2.78, p = .0027$; $Z = 3.76, p < .0001$). Therefore, both tests suggest that the significant variation in slopes remains unexplained after controlling for the Level-2 variables “average traditional victimization “ and “average cyberaggression”. The variability of the slope corresponding to “risky Internet behaviors” was only reduced by 1% $[(.0162-.0160) /.0162]$ after controlling for the effects of the explanatory variables of Level 2, whereas the reduction of the variability of the slope corresponding to “cyberaggression” reached 4% $[(.0835-.0801) /.0835]$.

Discussion

This work had three objectives. The first was to analyze the possible variability in the frequency of cybervictimization between the group classes analyzed. According to previous evidence (Festl et al., 2015), we expected to find that the characteristics of the group would explain a small but significant part of the variability (around 5%). The results obtained in this work confirm the working hypothesis: statistically significant differences were found in cybervictimization between the classes in the sample analyzed, with 5% explained by the group class variables.

A second objective was to analyze the possible effect of individual variables on the degree of cybervictimization. Sex was expected to have a weak but significant relationship with the degree of cybervictimization (Álvarez-García, Barreiro-Collazo et al., 2017). Age, low self-esteem, social anxiety, risky Internet behaviors, being a victim of traditional violence at school, antisocial behavior, and being a cyberaggressor were expected to show a positive relationship with being a victim of cyberaggression (Garaigordobil, 2017; Kowalski et al., 2014; van Geel et al., 2018). As expected, in the present work, we found a positive and statistically significant relationship of age, social anxiety, risky Internet behaviors,

being a victim of traditional violence at school, and cyberaggression with cybervictimization. On another hand, contrary to our expectations, the students' sex, level of self-esteem, and degree of antisocial behavior did not have a significant explanatory capacity, after statistically controlling for the effect of the rest of the analyzed variables.

Finally, the third objective, the main one of the study and its main novelty and contribution, was to analyze the possible effect of the characteristics of the group class on the probability of cybervictimization, controlling for the effect of the individual variables. Whereas previous evidence on this is very scarce so far, we expected that the group class size, as well as the percentage of repeaters, and average risky Internet behaviors, traditional victimization, traditional aggression, cyberaggression, and antisocial behavior in the group would show a positive relationship with the probability of cybervictimization. However, in the present work, only the average traditional victimization and the average cyberaggression in the group had a significant explanatory capacity, after statistically controlling for the effect of the rest of the analyzed variables.

These results not only have relevant theoretical implications, as they allow us to advance in the understanding of peer cybervictimization in adolescence, but also practical ones, referring both to the individual student and to their group class.

From an individual point of view, the fact that social anxiety and being a victim of traditional aggression in the educational environment are risk factors for peer cybervictimization reminds us of the great importance of developing social skills in students and promoting support and friendship networks among them, in this case, to prevent the specific problem of cybervictimization. It also shows the importance of taking into account these two variables as indicators for the early detection and treatment of the problem.

The fact that risky Internet behaviors and being a cyberaggressor are risk factors for being a victim of cyberaggression shows the importance of sensitizing and training students about the risks of the Internet, and offering guidelines for its safe, responsible, healthy, and respectful use.

The positive relationship found between age and the likelihood of cyberaggression suggests that the problem occurs to a greater extent in the last years of CSE than in the first years. Therefore, we should be especially vigilant in these courses and ages for its early detection and treatment. As these problems can occur in virtual contexts to

which teachers have no access, the collaboration of student witnesses is particularly important to detect and report the problem. Different peer support systems can be useful in this regard (Avilés, 2017). However, prevention should begin in the first years of CSE (Ortega-Barón et al., 2021) or even in Primary Education (Flores et al., 2020) to try to prevent the problem from occurring.

From the point of view of the group class to which the student belongs, the results obtained show that when an adolescent belongs to a group class in which it is common for classmates to be victims of traditional violence in the school and to be aggressors outside the school through the mobile phone and the Internet, it is more likely for this student to be the victim of cyberaggression. Previous studies have highlighted the importance of taking into account the processes of social influence and the role of subjective norms in the classroom: in groups in which students consider peer aggression as normal, they justify or even reinforce it, the probability of aggressions occurring increases and, therefore, the levels of victimization also increase (Dang & Liu, 2020; Gámez-Guadix & Gini, 2016; Saarento et al., 2015). Therefore, it is important not only to take into account the role of students as potential victims or aggressors but also as witnesses (Álvarez-García et al., 2021), developing attitudes and behaviors favoring the victim, rather than passive attitudes or attitudes favoring aggressor.

Although this work is a contribution to the field of study, it is not without limitations. One of them is the use of self-reports, which, although they have many advantages, also have some drawbacks, such as the informants' possible falsification of the response or the bias of social desirability. Another limitation is the sample, which, although it is large and randomly selected, is restricted to specific ages and a geographical context, so any generalization of the conclusions to other contexts should be done with caution. Finally, the model tested did not include all the variables related to the characteristics of the group class that can explain or predict cybervictimization. In the present work, a part of the variability was not explained by the factors included in the final model. That is, there are additional factors at the class level that could explain the differences in cybervictimization between classes. Thus, for example, some variables related to the teachers who teach in the group explain or predict traditional school victimization (Menesini & Salmivalli, 2017) and could also have a significant effect on cybervictimization. Also,

other contextual variables, which could affect the characteristics of the groups, such as the ownership of the school, could have an impact on the probability of an adolescent becoming a victim of cyberaggression (Machimbarrena et al., 2018).

In short, although cyberaggression usually occurs outside the school, the characteristics of the group class to which the adolescent belongs significantly influence the probability of their becoming a victim of cyberaggression. In particular, adolescents who belong to groups where peers are routinely victims of traditional school violence and who attack others through mobile phones and the Internet are more likely to be victims of cyberaggression. These results constitute further proof of the connection between offline and online socialization contexts, as well as the importance of peers and, in particular, classmates, in the socio-emotional well-being of adolescents in a problem as complex and potentially harmful as cybervictimization among adolescents.

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Cyber-control and cyber-aggression toward the partner in adolescent students: Prevalence and relationships with cyberbullying

Cibercontrol y ciberagresión hacia la pareja en alumnado adolescente: Prevalencia y relaciones con el ciberbullying

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Abstract

Information and Communication Technologies (ICTs) offer new educational opportunities and are essential in students' social relationships. However, the use of these technologies can also have negative consequences. Adolescent students can use these technologies to control and attack their partner, which is similar to way some students use ICTs to attack their classmates. The objective of this study was to analyze the prevalence of various behaviors of cyber-control and cyber-aggression toward the partner in adolescent boys and girls and examine their relationships with cyberbullying. To do so, 594 adolescents (56.7% girls, 43.3% boys) from 12 to 17 years old who had a partner or had had one in the previous 12 months participated in this study. The results indicated a higher prevalence of cyber-control behaviors toward the partner (between 8.2% and 26.8%), compared

to cyber-aggression behaviors such as insults, threats, or spreading malicious rumors (between 2% and 5.4%). The prevalence of cyber-control behaviors was similar in boys and girls, but some cyber-aggression behaviors showed a higher prevalence in boys. Adolescent boys and girls with frequent cyber-control and cyber-aggression behaviors toward their partner showed higher scores on cyberbullying perpetration, both direct and indirect. Nevertheless, direct cyberbullying was a better predictor of cyber-aggression toward the partner, and indirect cyberbullying was a better predictor of cyber-control toward the partner. These results show important relationships between cyberbullying and cyber dating violence in adolescent students, and they are useful for the development of prevention programs. Considering the relationships observed between the two types of problematic behaviors in adolescents, it would be advisable to implement programs for their joint prevention in educational contexts.

Key words: adolescents, students, cyberbullying, cyber dating violence, prevalence

Resumen

Las Tecnologías de la Información y la Comunicación (TICs) ofrecen nuevas oportunidades educativas y son fundamentales en las relaciones sociales del alumnado. Sin embargo, el uso de estas tecnologías puede tener también consecuencias negativas. El alumnado adolescente puede utilizar estas tecnologías para controlar y agredir a su pareja, de forma similar al uso que hacen de las TICs algunos alumnos para agredir a sus compañeros. El objetivo de este estudio fue analizar la prevalencia de diversas conductas de cibercontrol y ciberagresión a la pareja en chicos y chicas adolescentes y examinar sus relaciones con el cyberbullying. 594 adolescentes (56.7% chicas, 43.3% chicos), entre 12 y 17 años, que tenían pareja o la habían tenido en los 12 meses previos participaron en este estudio. Los resultados indicaron una prevalencia mayor de las conductas de cibercontrol hacia la pareja (entre 8.2% y 26.8%) comparadas con las conductas de ciberagresión, tales como insultos, amenazas o difusión de rumores maliciosos (entre 2% y 5.4%). La prevalencia de las conductas de cibercontrol fue similar en chicos y chicas, pero algunas conductas de ciberagresión mostraron mayor prevalencia en los chicos. Chicos y chicas adolescentes con conductas frecuentes de cibercontrol y ciberagresión hacia la pareja mostraron puntuaciones más altas en perpetración de cyberbullying, tanto directo como indirecto. No obstante, el cyberbullying directo fue un mejor predictor de la ciberagresión a la pareja y el cyberbullying indirecto del cibercontrol a la pareja. Estos resultados constatan importantes relaciones entre el cyberbullying y la ciberviolencia de pareja en alumnado adolescente y son de utilidad para el desarrollo de programas de prevención. Teniendo en cuenta las relaciones observadas entre ambos tipos

de conductas problemáticas en adolescentes, sería conveniente implementar programas para su prevención conjunta en contextos educativos.

Palabras clave: adolescentes, alumnado, ciberbullying, ciberviolencia pareja, prevalencia

Introduction

Currently, Information and Communication Technologies (ICTs) are essential for adolescent students due to their growing impact on their social relationships with their classmates and friends and in their first romantic relationships (Baker & Carreño, 2016; Mosley & Lancaster, 2019; Smith et al., 2018; Stonard, 2020). Adolescents increasingly use ICTs in their daily lives, both for academic purposes and to initiate and maintain social relationships. Thus, according to data from the National Institute of Statistics report (INE, 2020) on the use of mobile devices and Internet in Spain, 94.5% of children and adolescents between 10 and 15 years old use the Internet, and 69.5% have their own mobile phones. Whereas 41.4% of adolescents have a mobile phone at the age of 11, at the age of 15 this percentage rises to 95.7%.

In the educational field, the importance of social relationships among students, both for their psychosocial well-being and for the teaching-learning process (Arslan, 2021; Turunen et al., 2021), is well-known. Students who experience situations of rejection, social exclusion, or bullying show greater academic difficulties, whereas inclusive school climates and sufficiently high-quality student relationships foster the learning process (Jiménez et al., 2021). Therefore, it is essential to consider the difficulties some students may have in their relationships that could be made worse by their increasing use of ICTs. In this regard, in recent decades, numerous studies have been carried out on cyberbullying and its consequences for the victim (Buelga et al., 2020; Garaigordobil & Larrain, 2020; González-Cabrera et al., 2019; Machimbarrena et al., 2018; Iranzo et al., 2019).

Cyberbullying refers to the use by one or more people of electronic devices to intentionally attack someone who cannot defend themselves

(Buelga et al., 2020; Marciano et al., 2020). In many cases, it consists of an extension of previous bullying situations between peers that originated in the classroom context and continue online in the virtual space (Iranzo et al., 2019). These online aggressions can be carried out both directly and indirectly (Aboujaoude et al., 2015; Buelga et al., 2020; Marciano et al., 2020). On the one hand, in direct cyberbullying, the victim receives direct attacks from one or more aggressors through actions such as continuous threatening text messages or insults. On the other hand, in indirect cyberbullying, the aggressors seek to harm their victims through indirect actions such as creating false profiles for them or entering their personal accounts to cause them harm (Walrave et al., 2020). Students who experience cyberbullying present serious difficulties in their school adjustment and psychosocial well-being (Garaigordobil & Larrain, 2020; Iranzo et al., 2019). For this reason, several programs have been developed for cyberbullying prevention in the educational setting (Gaffney et al., 2019; Garaigordobil & Martínez-Valderrey, 2015; Gradinger et al., 2015; Ortega-Barón et al., 2019).

However, cyber dating violence also poses a serious problem faced by a growing number of adolescent students (Caridade et al., 2019; Stonard, 2020). Although early romantic relationships are positive life experiences for most adolescents (Smetana et al., 2006), situations of violence arise in some of these relationships (Carrascosa et al., 2018; Cava et al., 2021; Viejo, 2014). In addition, adolescents' frequent use of ICTs is leading to an increase in behaviors of aggression and control over the partner through these technologies (Caridade et al., 2019; Cava et al., 2020; Ortega-Barón et al., 2020), although less is known about this reality, and there are fewer intervention programs for its prevention in educational contexts (Carrascosa et al., 2019; Galende et al., 2020).

Cyber dating violence is defined as the use of ICTs to control, harass, threaten, and harm a current or previous partner (Brown & Hegarty, 2018; Peskin et al., 2017; Smith et al. 2018; Temple et al., 2016). The two main ways of exercising this cyber violence are cyber-control and cyber-aggression (Borrajo et al., 2015; Branson & March, 2021; Cava & Buelga, 2018; Villora et al., 2019a, 2019b). In the case of cyber-control, the behaviors performed involve constantly monitoring the partner's activity in social networks, controlling their social contacts and demanding, for example, that they remove contacts, block friends, or delete photos. Cyber-aggression includes making direct insults and threats to the partner and

spreading or threatening to spread humiliating and denigrating rumors, photos, videos, or comments about the partner on social networks. Cyber dating violence has some important differences from dating violence outside social networks that make it especially harmful to the victim. In the virtual space, aggression and control over the partner can be carried out at any time of day or night and from any location, with the possibility of constantly having access to the victim (Borrajo et al., 2015; Paat & Markham, 2021; Peskin et al., 2017; Stonard, 2020; Zweig et al., 2013). In addition, social networks allow humiliating photos, comments, and videos of the partner to be quickly spread to large numbers of people, thus increasing the victim's feelings of helplessness due to being unable to control the personal information being disseminated (Hancock et al., 2017; Stonard, 2020; Temple et al., 2016).

Both cyber dating violence and cyberbullying use ICTs as a means to harm the victim, and, therefore, they share several characteristics (Caridade et al., 2019; Walrave et al., 2020). Although in cyber dating violence there is a romantic relationship, whether current or previous, between the aggressor and the victim, and possibly more knowledge about the victim's private information that could be humiliating if spread (Stonard, 2020), in both cyberbullying and cyber dating violence the aggressor can remain anonymous, if desired, and have constant access to the victim (Walrave et al., 2020). Moreover, the use of ICTs in both types of violence facilitates disinhibition of aggressive behaviors because aggressors do not directly observe the consequences for victims or have to face their reactions (Suler, 2004). In this regard, Stonard (2020) pointed out that some behaviors that would never be performed face-to-face are carried out using digital technologies. These common characteristics of cyberbullying and cyber dating violence could explain why students who frequently use ICTs to attack their peers also use them to attack and control their partners. These students might have integrated this form of aggression into their repertoire of behaviors and their usual way of reacting to interpersonal conflicts. Social learning processes and lack of self-control, which might make it possible to explain online aggressions (Curry & Zavala, 2020; Van Ouytsel et al., 2020), could be initiated in the context of peer relationships and continue later in early romantic relationships. In fact, links between cyberbullying and cyber dating violence have been suggested in previous studies (Caridade et al., 2019; Machimbarrena et al., 2018), and several studies have also found

the existence of relationships between bullying and dating violence in adolescents (Zych, 2021). However, there are still important aspects that warrant further research. For example, it would be useful to analyze to what extent the different types of cyberbullying, direct and indirect, may be more or less linked to the different forms of cyber dating violence, cyber-control and cyber-aggression. Whereas direct cyberbullying and cyber dating aggression both involve direct attacks against the victim, in both indirect cyberbullying and cyber-control toward partner there is no direct aggression. Therefore, the relationship between direct cyberbullying and partner cyber-aggression could be greater because they are both direct forms of online aggression that could be internalized within the behavioral repertoire of some adolescents through social learning processes (Curry & Zavala, 2020). Likewise, the relationship between indirect cyberbullying and cyber-control of the partner could also be greater, due to the internalization of the use of indirect forms of aggression by some adolescents that focus more on damaging and controlling the victim's social relationships (Curry & Zavala, 2020).

In addition, although some studies have analyzed the prevalence of cyber-control and cyber-aggression toward the partner in adolescents, it would be useful to know more about what specific behaviors are more frequent, in order to be able to intervene more specifically in these behaviors, as well as analyzing possible differences between boys and girls. Previous studies have indicated that between 12% and 33% of adolescents perform some type of cyberviolence behavior toward their partner (Peskin et al., 2017; Smith et al., 2018; Zweig et al., 2013), with the prevalence of cyber-control being higher (Borrajo et al., 2015; Cava et al., 2020; Muñoz-Rivas et al., 2019). Regarding specific behaviors, Calvete et al. (2021) found that sending insulting and/or threatening messages to the partner was the most frequent form of direct online aggression in adolescents, and using the mobile phone or Internet to control where the partner has been and with whom was the most frequent form of cyber-control. However, possible differences between boys and girls in the use of these behaviors have not been analyzed, and previous studies on gender differences in the perpetration of cyber dating violence are inconclusive. Thus, some studies have not observed significant differences (Smith et al., 2018; Zweig et al., 2013), others (Muñoz-Rivas et al., 2019) point to greater involvement of boys in cyber-aggression against partners (3.6% boys; 1.5% girls), and others (Calvete et al., 2021) find a greater

involvement of girls in cyber-control. Therefore, it is necessary to further explore gender differences in these behaviors and explore whether the relationship between cyberbullying and cyber dating violence is similar or different in boys and girls.

Furthermore, another important issue to consider when analyzing possible differences between boys and girls, and especially their relationship with cyberbullying, is the need to distinguish between their frequent or occasional involvement in cyber dating violence. Occasional cyber dating violence behaviors in adolescents have been related to their lack of previous experience in dating relationships, their use of awkward forms of courtship, and their belief in some romantic love myths that associate control with love (Cava et al., 2020a; Viejo, 2014). However, the frequent performance of these behaviors could indicate a worse psychosocial adjustment of the adolescent and, therefore, be more related to the use of other problematic behaviors, such as cyberbullying. The frequency and type of cyber dating violence perpetrated by boys and girls should, therefore, be included in the analysis of its relationship with the perpetration of cyberbullying.

Taking into account the relevance of this problem, this study had the following objectives: (1) to analyze the prevalence of specific cyber-control and cyber-aggression behaviors toward the partner performed by adolescent boys and girls, considering possible gender differences; (2) to analyze the correlations between the perpetration of cyber-control of the partner, cyber dating aggression, indirect cyberbullying, and direct cyberbullying in boys and girls; (3) to examine the differences in cyberbullying perpetration (indirect and direct) as a function of the frequency (never, occasional, and frequent) with which boys and girls perform cyber-control and cyber-aggression behaviors toward the partner; (4) to analyze the association between indirect and direct cyberbullying and cyber-control and cyber-aggression behaviors toward the partner in boys and girls. With regard to these objectives, the following hypotheses were established: (1) The prevalence of cyber-control behaviors will be higher than the prevalence of cyber-aggression behaviors in both boys and girls, with significant gender differences in some specific behaviors; (2) Cyber-control and cyber-aggression behaviors toward the partner will show significant positive correlations with the perpetration of cyberbullying in boys and girls; (3) Boys and girls with frequent cyber-control and cyber-aggression behaviors toward their partners will

show higher scores on indirect and direct cyberbullying perpetration, compared to those who never engage in these behaviors; (4) Direct cyberbullying will show greater links with cyber dating aggression than indirect cyberbullying, whereas indirect cyberbullying will have greater links with cyber-control of the partner.

Method

Sample

From an initial sample of 1063 secondary school students from three schools in the Valencian Community, in this study, we included those who had a partner or had had a partner during the previous 12 months. Previously, they were asked to consider as a couple relationship a romantic relationship that had been significant to them and had lasted longer than a single date. If they had had several relationships during the previous 12 months, they were asked to answer the questions with their last relationship in mind. The final sample consisted of 594 students (43.3% boys, 56.7% girls) from 12 to 17 years old ($M = 14.31$; $SD = 1.58$). The mean age of boys ($M = 14.22$; $SD = 1.59$) and girls ($M = 14.37$; $SD = 1.57$) was similar. Most students were 13 years old (25%), 14 years old (19.1%), and 15 years old (18.6%), with lower percentages of students aged 12 years (12.6%), 16 years (11.6%), and 17 years (13.1%). Regarding the duration of their relationship, the majority (52.9%) indicated that it lasted between 1 and 6 months, 15.8% less than 1 month, 17.5% between 6 months and 1 year, and 13.4% more than 1 year.

Instruments

Cyber-Violence in Adolescent Couples Scale, Cib-VPA (Cava & Buelga, 2018). This scale consists of two subscales: cyber-violence perpetrated and cyber-victimization. In this study, only the cyber-violence perpetrated subscale was used, which is composed of 10 items distributed in two factors: cyber-control and cyber-aggression. The cyber-control factor includes 5 items that describe various behaviors of control over the

partner's activities and social relationships through electronic devices (e.g., "I have made him/her delete or block friends from his/her networks or mobile phone, so that he/she does not have contact with them"). The cyber-aggression factor consists of 5 items that describe different behaviors involving direct aggression and harm to the partner using electronic devices (e.g., "I have insulted or threatened my boy/girlfriend in private"). Students indicate the frequency with which they engage in these behaviors, with four options: 1 (*never*), 2 (*sometimes*), 3 (*often*), and 4 (*always*). The reliability (Cronbach's) in this sample was .74 for the cyber-control factor and .88 for the cyber-aggression factor.

Cyber-Aggressor Scale, CYB-AGS (Buelga et al., 2020). This scale consists of 18 items grouped in two factors: direct cyberbullying and indirect cyberbullying. The direct cyberbullying factor includes 10 items that describe different situations of direct aggression using electronic devices (e.g., "I have criticized or made fun of comments, photos, or videos that a person has uploaded on social networks or in groups such as WhatsApp"). The indirect cyberbullying factor consists of 8 items that describe situations in which the harm to the victim with electronic devices is done indirectly (e.g., "I have created a fake profile on the Internet with someone's personal data to say or do bad things, impersonating him/her"). Students answer by indicating how often they have performed these behaviors in the past 12 months: 1 (*never*), 2 (*once or twice*), 3 (*three to five times*), 4 (*six to ten times*), 5 (*more than ten times*). Reliability (Cronbach's) in this sample was .90 for the direct cyberbullying factor and .82 for indirect cyberbullying.

Procedure

To select the participants, several schools were contacted to request a first meeting. At this meeting they were informed in detail about the study objectives, any doubts were resolved, and their participation was requested. The three schools that attended this initial meeting agreed to participate. The families of the students were also informed by letter about the research objectives, the confidentiality of the data obtained, and the possibility of contacting the research team for further information; at the same time, they were asked for their consent for their children's participation. Only 2% of the families indicated that they did not want

their children to participate. The students completed the scales in their regular classrooms in the presence of a member of the research team. Previously, the students were informed of the voluntary nature of their participation, the possibility of leaving the study at any time, and the confidentiality of all data. The importance of sincerity in responding was emphasized. None of the students refused to participate.

Data analysis

First, we analyzed the frequency of different cyber-control and cyber-aggression behaviors carried out by boys and girls, analyzing possible gender differences using χ^2 and the effect size with Cramer's V. Next, we calculated the correlations (Pearson) between the variables of cyber-control, cyber-aggression, perpetration of indirect cyberbullying, and perpetration of direct cyberbullying in boys and girls separately, as well as descriptive statistics (M , SD) of these variables, analyzing the significance of the differences in means between boys and girls with the Student's t test. Then, we compared the scores on perpetration of indirect cyberbullying and direct cyberbullying in students with different levels of involvement (never, occasional, and frequent) in cyber-control and cyber-aggression behaviors toward the partner using multivariate analyses (MANOVA). Based on criteria used in previous studies (Marini et al., 2006), we considered the mean + 1 SD as the cut-off point to differentiate between adolescents with frequent and occasional involvement. The adolescents with scores above the mean + 1 SD on cyber-control (girls: score > 1.48; $M = 1.17$, $SD = 0.31$; boys: score > 1.56; $M = 1.21$, $SD = 0.35$) were assigned to the "frequent cyber-control" group (19.5% of the boys; 12.2% of the girls); those with scores below this cut-off point were assigned to the "occasional cyber-control" group (16% of the boys; 23.7% of the girls); and those who indicated that they did not engage in any of these behaviors were assigned to the "no cyber-control" group (64.5% of the boys; 64.1% of the girls). This same criterion (girls: score > 1.21; $M = 1.03$, $SD = 0.18$; boys: score > 1.36; $M = 1.08$, $SD = 0.28$) was used to differentiate between adolescents with frequent involvement in cyber-aggression (9.7% of the boys and 9% of the girls were assigned to this group), occasional involvement (4.3% of the boys; 3.3% of the girls), and not involved (86% of the boys; 94.1% of the girls). Finally, regression

analyses were performed to estimate, in boys and girls, the predictive capacity of indirect and direct cyberbullying on the variables of cyber-control and cyber-aggression toward the partner.

Results

Table I shows the prevalence of different behaviors of cyber-control and cyber-aggression toward the partner. This table shows a higher prevalence of cyber-control behaviors (items 1 to 5), with no significant differences between boys and girls. The cyber-control behavior with the highest prevalence is “showing anger if the partner is online and does not answer right away”, with 26.8% of adolescents engaging in it (18.9% do it sometimes and 7.9% often/always), whereas the lowest prevalence corresponds to “forcing their partner to block or delete friends”, with 8.2% (5.6% do this sometimes and 1.7% often/always). The most frequently performed cyber-aggression behavior is “sending or uploading photos, videos, or messages to social networks that the partner did not want people to see, without his/her permission” (5.4%), with a significantly higher prevalence in boys (8.9%) than in girls (2.7%). Moreover, boys more frequently perform the cyber-aggression behaviors of “spreading rumors or lies about their girl/boyfriend on social networks” (5.9% boys; 1.8% girls) and “making public comments about their partner on the Internet and in WhatsApp groups that made them feel bad” (8.2% boys; 2.1% girls). The least frequently performed cyber-aggression behavior (2%) is “telling the partner that, if he/she breaks up, I will say or post things about him/her on social networks”.

TABLE I. Prevalence of cyber-control and cyber-aggression toward the partner in adolescent students.

	Never	Some-times	Often/ Always	χ^2	Cra-mer's V
1. I get angry if I see that my boy/ girlfriend is online and doesn't answer me right away Boys Girls Total	190(73.9%) 245(72.7%) 435(73.2%)	46(17.9%) 66(19.6%) 112(18.9%)	21(8.2%) 26(7.7%) 47(7.9%)	.29 ($p=.866$)	.02
2. I am aware of whether my boy/ girlfriend is online, on the mobi- le phone, or connected to social networks. Boys Girls Total	208(80.9%) 289(85.8%) 497(83.7%)	31(12.1%) 36(10.7%) 67(11.3 %)	18(7%) 12(3.6%) 30(5.1%)	4.07 ($p=.130$)	.08
3. I don't let him/her chat with some friends, and if he/she does, I get angry and make him/her feel bad Boys Girls Total	221(86%) 293(86.9%) 514(86.5%)	29(11.3%) 36(10.7%) 65(10.9%)	7(2.7%) 8(2.4%) 15(2.6%)	.13 ($p=.935$)	.02
4. I made him/her delete or block friends from his/her networks or mobile phone, so that he/she doesn't have contact with them Boys Girls Total	233(90.7%) 318(94.4%) 551(92.8%)	20(7.8%) 13(3.9%) 33(5.6%)	4(1.6%) 6(1.8%) 10(1.7%)	4.30 ($p=.116$)	.09
5. I get jealous about his/her com- ments, photos, or videos in social networks, and I make him/her delete them Boys Girls Total	227(88.3%) 307(91.1%) 534(89.9%)	18(7%) 23(6.8%) 41(6.9%)	12(4.7%) 7(2.1%) 19(3.2%)	3.19 ($p=.202$)	.07
6. I have spread rumors or lies about my girl/boyfriend in social networks Boys Girls Total	242(94.2%) 331(98.2%) 573(96.5%)	10(3.9%) 4(1.2%) 14(2.4%)	5(2%) 2(0.6%) 7(1.2%)	7.03* ($p=.030$)	.11

	Never	Some-times	Often/ Always	χ^2	Cra-mer's V
7. I have insulted or threatened my girl/boyfriend privately					
Boys	241(93.8%)	11(4.3%)	5(2%)	3.70 (<i>p</i> =.157)	.08
Girls	327(97%)	7(2.1%)	3(0.9%)		
Total	568(95.6%)	18(3%)	8(1.4%)		
8. I have told him/her that, if he/she breaks up with me, I will say or publish his/her personal things on social networks					
Boys	248(96.5%)	4(1.6%)	5(2%)	5.11 (<i>p</i> =.078)	.09
Girls	334(99.1%)	1(0.3%)	2(0.6%)		
Total	582(98%)	5(0.8%)	7(1.2%)		
9. I have made public comments about my boy/girlfriend on the Internet and in WhatsApp groups that have made him/her feel bad					
Boys	236(91.8%)	16(6.2%)	5(2%)	12.10** (<i>p</i> =.002)	.14
Girls	330(97.9%)	5(1.5%)	2(0.6%)		
Total	566(95.3%)	21(3.5%)	7(1.2%)		
10. I have sent or uploaded to social networks photos, videos or messages that he/she did not want people to see without his/her permission.					
Boys	234(91.1%)	18(7%)	5(1.9%)	11.66** (<i>p</i> =.003)	.14
Girls	328(97.3%)	6(1.8%)	3(0.9%)		
Total	562(94.6%)	24(4%)	8(1.4%)		

Note: Frequency (%); **p*<.05, ***p*<.01

Table II shows significant positive correlations between cyber-control and cyber-aggression, and between both forms of cyber dating violence and indirect and direct cyberbullying, in both boys and girls. Some correlations were significantly higher in girls than in boys. This is the case of the correlations between cyberbullying and cyber-aggression toward the partner ($r = .39$ in boys; $r = .52$ in girls; $Z = -1.976$; $p < .05$), between cyber-control toward the partner and indirect cyberbullying ($r = .28$ in boys; $r = .44$ in girls; $Z = -2.216$; $p < .05$), and between cyber-aggression and direct cyberbullying ($r = .36$ in boys; $r = .59$ in girls; $Z = -3.61$; $p < .01$). Regarding gender differences, boys showed significantly higher scores on cyber-aggression toward the partner, indirect cyberbullying, and direct cyberbullying.

TABLE II. Correlations among variables (boys above the diagonal), means, and standard deviations.

	Cyber-control partner	Cyber-aggression partner	Indirect Cyberbullying	Direct Cyberbullying
Cyber-control Partner		.39**	.28**	.23**
Cyber-aggression Partner	.52**		.29**	.36**
Indirect Cyberbullying	.44**	.35**		.65**
Direct Cyberbullying	.33**	.59**	.68**	
Boys M (SD)	1.21 (.35)	1.08** (.28)	1.49** (.58)	1.16* (.38)
Girls M (SD)	1.17 (.31)	1.03** (.18)	1.38** (.47)	1.09* (.31)

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Table III shows the differences in cyberbullying (indirect and direct) according to the students' involvement (never, occasional, and frequent) in cyber-control toward their partners. In boys, those with frequent cyber-control behaviors showed significantly higher scores on direct and indirect cyberbullying than those who never engaged in these behaviors. No significant differences in direct and indirect cyberbullying were observed between boys with occasional cyber-control behaviors toward their partner and those who did not engage in cyber-control behaviors. In girls, those with frequent cyber-control toward their partner showed higher scores on direct and indirect cyberbullying compared to those who never engaged in these behaviors and those who occasionally engaged in these behaviors. Girls with occasional cyber-control behaviors had higher scores on indirect cyberbullying than those who did not engage in these behaviors.

TABLE III. Means (and standard deviations) for indirect and direct cyberbullying in boys and girls with different levels of involvement in cyber-control toward their partner.

BOYS						
	No Cyber-control (1)	Occasional Cyber-control (2)	Frequent Cyber-control (3)	p	η^2	Post-hoc
	M (SD)	M (SD)	M (SD)			
Indirect cyberbullying	1.38(0.50)	1.58(0.48)	1.84(0.75)	<.001	.098	1<3
Direct cyberbullying	1.10(0.31)	1.18(0.36)	1.36(0.55)	<.001	.068	1<3
GIRLS						
	No Cyber-control (1)	Occasional Cyber-control (2)	Frequent Cyber-control (3)	p	η^2	Post-hoc
	M (SD)	M (SD)	M (SD)			
Indirect Cyberbullying	1.27(0.40)	1.42(0.40)	1.88(0.62)	<.001	.170	1<3, 1<2, 2<3
Direct Cyberbullying	1.06(0.27)	1.08(0.18)	1.27(0.57)	<.001	.048	1<3, 2<3

The differences in indirect and direct cyberbullying according to the different levels of involvement (never, occasional, and frequent) in cyber-aggression toward their partner are shown below (Table IV). Boys and girls with frequent cyber-aggression behaviors toward the partner showed significantly higher scores on indirect and direct cyberbullying than boys and girls who did not engage in these behaviors or who did so occasionally. Girls with occasional cyber-aggression toward their partners also showed higher scores on indirect cyberbullying, compared to girls who never engaged in these behaviors.

TABLE IV. Means (and standard deviations) for indirect and direct cyberbullying in boys and girls with different levels of involvement in cyber-aggression toward the partner.

BOYS						
	No Cyber-aggression (1)	Occasional Cyber-aggression (2)	Frequent Cyber-aggression (3)	p	η^2	Post-hoc
	M (SD)	M (SD)	M (SD)			
Indirect Cyberbullying	1.44(0.55)	1.75(0.31)	1.93(0.72)	<.001	.072	1<3
Direct Cyberbullying	1.12(0.34)	1.14(0.19)	1.54(0.59)	<.001	.104	1<3;2<3
GIRLS						
	No Cyber-aggression (1)	Occasional Cyber-aggression (2)	Frequent Cyber-aggression (3)	p	η^2	Post-hoc
	M (SD)	M (SD)	M (SD)			
Indirect Cyberbullying	1.34(0.42)	1.70(0.54)	2.18(1.08)	<.001	.098	1<2, 1<3
Direct Cyberbullying	1.06(0.22)	1.16(0.19)	1.96(1.18)	<.001	.212	1<3, 2<3

Finally, Table V shows the results of the regression analyses, considering cyber-control and cyber-aggression as dependent variables and indirect cyberbullying and direct cyberbullying as predictor variables. For cyber-control, the only significant predictor variable was indirect cyberbullying in both boys and girls. This variable explained 7.6% of the variance in cyber-control behaviors in boys, $F(1, 255) = 21.947, p < .001$, and 19.5% in girls, $F(1, 334) = 81.967, p < .001$. However, in the case of cyber-aggression toward the partner, indirect cyberbullying was not a significant predictor, but direct cyberbullying was. In both boys and girls, direct cyberbullying was a significant predictor variable, explaining 12.6 % of cyber-aggression in boys, $F(1, 255) = 38.025, p < .001$, and 35% of cyber-aggression in girls, $F(1, 334) = 181.582, p < .001$. The high percentage of variance in cyber-aggression toward the partner explained by this particular variable in girls is noteworthy.

TABLE V. Regression analysis. Dependent variables: cyber-control and cyber-aggression

	CYBER-CONTROL					
	Boys			Girls		
	b	t	p	b	t	p
Indirect Cyberbullying	.28	4.69	<.001	.44	9.05	<.001
Direct Cyberbullying	.08	.99	.322	.05	.81	.420
	CYBER-AGGRESSION					
	Boys			Girls		
	b	t	p	b	t	p
Indirect Cyberbullying	.10	1.28	.203	-.09	-1.59	.113
Direct Cyberbullying	.36	6.17	<.001	.59	13.48	<.001

Conclusions

The first objective of this study was to analyze the prevalence of various cyber-control and cyber-aggression behaviors toward the partner in adolescent students. The results obtained confirmed that cyber-control behaviors are more prevalent than cyber-aggression behaviors in adolescents (Borrajo et al., 2015; Calvete et al., 2021; Muñiz-Rivas et al., 2019), as hypothesized, with similar percentages of cyber-control used by boys and girls. The prevalence of cyber-control behaviors in this study ranged from 8.2% (forcing them to block or delete friends from their social networks or mobile, so that they do not have contact with them) to 26.8% (getting angry if the partner is online and does not answer right away), whereas the prevalence of cyber-aggression behaviors ranged from 2% (threatening to tell or post personal information on social networks if they break off the relationship) to 5.4% (uploading photos, videos, or messages to social networks that they did not want people to see without their permission).

On the one hand, the higher prevalence of cyber-control behaviors could be associated with their lower perception of these behaviors as

a form of cyber dating violence. Beliefs in certain romantic myths that associate jealousy and control with love, present in many adolescents, have been related to their involvement in partner cyber-control behaviors (Cava et al., 2020; Rodríguez-Castro et al., 2018, 2021) and could contribute to less awareness of these behaviors as cyber dating violence. In the educational context, it would be necessary to discuss some of these beliefs with students. In addition, because, contrary to what was hypothesized, no significant differences were found between boys and girls on any cyber-control behavior, it is important to reflect on beliefs and myths about romantic relationships with both boys and girls. More specifically, it is necessary to talk to them about their need to continuously be aware of whether their boy/girlfriend is online, on the mobile phone, or connected to social networks. In this study, 5.1% of the adolescents acknowledged that they exercised this type of control over their partner often or always, and 11.3% did it sometimes. ICTs are deeply integrated into the lives of adolescents (Baker & Carreño, 2016; Mosley & Lancaster, 2019; Stonard, 2020), and they make it easy to constantly control and monitor other people's activities in the virtual space, including their partner. Therefore, adolescent students need to be better educated about the negative consequences of partner control and increase their ability to establish healthy and positive relationships, given their lack of previous experience (Carrascosa et al., 2019; Viejo, 2014). In addition, early dating relationships have an enormous influence on subsequent couple relationships in adulthood because certain relationship patterns are consolidated and tend to continue (González-Ortega et al., 2008). For this reason, it is essential to carry out interventions with students about these issues, about which both boys and girls need training.

On the other hand, cyber-aggression toward the partner, although less prevalent, also make it necessary to discuss with students the damage and negative consequences for the victim of this use of ICTs. As Suler (2004) points out, ICTs favor the disinhibition of aggressive behaviors that would never be carried out face to face, given the emotional distance from the victim that these technologies allow. Thus, for example, the fact that 4.4% of adolescents admit to having insulted or threatened their partner in private (1.4% often or always) is worrisome and highlights the need to intervene with these adolescents regarding their use of these technologies. In addition, in the case of cyber-aggression toward the partner, the results, in line with the initial hypothesis, show gender

differences in some specific behaviors. Thus, although both boys and girls engage in cyber-aggression behaviors toward their partners, boys had higher percentages on the behaviors of “spreading rumors about their partners on social networks” (5.9% boys; 1.8% girls), “sending or uploading to social networks photos, videos, or messages that the partner did not want people to see without his/her permission” (8.9% boys; 2.7% girls), and “making public comments about the partner on the Internet and in WhatsApp groups that made him/her feel bad” (8.2% boys; 2.1% girls). These differences could be linked to a greater influence of sexist attitudes in boys, as observed in some previous studies (Cava et al., 2020; Ramiro-Sánchez et al., 2018). However, research on gender differences in cyber dating violence is still scarce, and these aspects should be analyzed in greater depth in future investigations.

The results obtained also confirm the second hypothesis, given that positive correlations were found between the perpetration of cyber dating violence and the perpetration of cyberbullying in both boys and girls. Adolescents who engage in cyberbullying behaviors also exert more cyber-control and cyber-aggression toward their partners. It is possible that the same social learning processes and lack of self-control (Curry & Zavala, 2020; Van Ouytsel et al., 2020), as well as similar emotional distancing from the victim (Suler, 2004), are present in both forms of violence perpetrated using ICTs. Likewise, the data from this study allow us to confirm the third hypothesis because boys and girls with frequent cyber-control and cyber-aggression behaviors toward the partner showed significant differences from those who never performed these behaviors, in terms of greater perpetration of direct and indirect cyberbullying. This result is especially interesting because in adolescents with occasional cyber-control and cyber-aggression behaviors, the differences from those who never perform these behaviors were much smaller. These data support, therefore, the existence of occasional and low-severity aggressive behaviors in adolescent couples, possibly linked to limited previous experience in romantic relationships and the use of awkward and rough forms of courtship (Carrascosa et al., 2018; Viejo, 2014). Although these occasional aggressions also indicate the need for more education about healthy dating relationships, the cases of frequent cyber-control and cyber dating aggression are the ones that require early detection and intervention and are more linked to the perpetration of cyberbullying.

Finally, regarding the fourth hypothesis about the different links depending on the type of cyberbullying (direct and indirect) and cyber dating violence (cyber-control and cyber-aggression) perpetrated by adolescents, the results confirmed that indirect cyberbullying was a better predictor of cyber-control, and direct cyberbullying was a better predictor of partner cyber-aggression, in both boys and girls. These stronger links between partner cyber-control and indirect cyberbullying could be related to the fact that both involve indirect attacks against the victim. Thus, in cyber-control, the victim may not know that this control and supervision is taking place, and in indirect cyberbullying, the victim may not know who is impersonating his/her identity or creating false profiles to harm him/her. In these indirect attacks, the cyber-aggressor may be less impulsive, and the violence may be more planned. In contrast, in direct cyberbullying and cyber-aggressions against a partner, the cyber-aggressor directly attacks the victim, and there is a direct confrontation with the victim. These direct attacks could be more related to learning violent ways of responding to interpersonal conflicts, internalization of cyber-aggression behaviors, and greater difficulties with self-control. These different potential explanatory factors of direct and indirect online aggressions should be further analyzed in future research.

The present study has some limitations. First, given that it is a cross-sectional study, it is not possible to establish causal relationships between cyberbullying and cyber dating violence, making it necessary to conduct longitudinal studies in order to discover how these variables influence each other. Another limitation is the use of self-reports to measure the variables. Although this type of measure is frequent in studies on adolescent violence (Muñiz-Rivas et al., 2019), it would be advisable to complement these data with other sources and obtain information from both partners. Moreover, a further limitation is that some adolescents might have dating relationships in which both partners engage in cyber-control and cyber-aggression behaviors. Occasional mutual aggressions are highly prevalent in adolescent couples (Viejo, 2014), with some adolescents being both aggressors and victims at the same time. This aspect should be considered in future studies.

However, despite these limitations, this study provides interesting results about the prevalence of different cyber-control and cyber-aggression behaviors toward the partner in adolescent students, revealing a higher prevalence of cyber-control. Strong links are also found between

cyber dating violence behaviors and cyberbullying perpetrated by boys and girls, which highlights the need to develop joint prevention strategies for both problems, making students aware of the dangers of misusing ICTs. Possible inadequate regulation of emotions and management of interpersonal conflicts, as well as greater disinhibition of aggressive behavior in the virtual space, are important elements common to both forms of online violence, which justifies the need to intervene in preventing both at the same time. Along the same lines, there are programs aimed at the simultaneous prevention of various problems in adolescents, such as Fourth R (Wolfe et al., 2011), as well as programs specifically designed for the combined prevention of bullying and offline dating violence in adolescents (Carrascosa et al., 2019; Foshee et al., 2014), which have been found to be effective. Therefore, it would also be advisable to develop interventions to simultaneously prevent cyberbullying and cyber dating violence in adolescent students.

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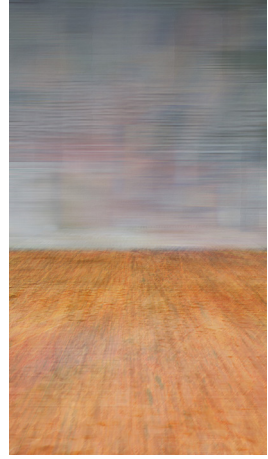
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Research

Reviewing the role of Education in the prevention of radicalisation in Europe

La Educación en la prevención del radicalismo: una revisión para Europa

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Abstract

This study analyses the extent to which global competence attitudes (OECD, 2018) - openness, respect, civic-mindedness, responsibility, self-efficacy and tolerance - are factored into the counter-radicalisation documents published by the governments of 16 European countries, whose placement into one of two control groups is determined by the presence or absence of fatalities following terrorist attacks. According to PISA's assessment in 2018, these attitudes underpin the concept of democratic and inter-culturally competent citizenship. The project involves a comparative methodology with lexicographic content analysis (Iramuteq) and critical interpretive analysis which contextualises the documents. As shown by the results, the regulations of countries in which terrorist attacks have resulted in fatalities prioritise vigilance, seek to detect the threat, and regard education as a secondary concern. Conversely, in countries where terrorist attacks have not had deadly consequences, their regulations emphasise public safety and security, and contain hardly any references to education. The lexicographic analysis indicates that, of the 6 attitudes, the most highly valued are respect, responsibility and tolerance. At the other end of the scale are self-efficacy and civic-mindedness. The conclusion is that European policies on radicalisation are defective in terms of prevention and fail to address the issues of identity and

inclusion, which are at the root of the problem. Moreover, while socio-educational policies are believed to be fundamental to the success of inclusion strategies, in practice they restrict the capacity of the school to detect signs of radicalisation and there is evidence of an increase in practices which suggest that education systems are being made subordinate to security agendas, whereby preventive responsibilities are assigned to schools and universities. There is a proposal for holistic and cross-cutting inclusion policies which, on the basis of an intercultural approach, reassess the role of the school, make education independent of security agendas and guard against political undercurrents which permeate counter-radicalisation discourse.

Key words: global competence, attitude, PISA, civic education, intercultural education, radicalization, extremism, inclusion, democracy.

Resumen

Esta investigación analiza si las actitudes de la competencia global (OECD, 2018) -apertura, respeto, conciencia cívica, responsabilidad, autoeficacia y tolerancia- se recogen en los documentos gubernamentales sobre prevención del radicalismo de 16 países europeos, aglutinados en dos grupos control, en función de la presencia o ausencia de víctimas mortales en los atentados. Estas actitudes, evaluadas por PISA en 2018, definen a una ciudadanía democrática e interculturalmente competente. Se emplea una metodología comparativa con un análisis de contenido lexicográfico mediante el software Iramuteq junto al análisis crítico-interpretativo que contextualiza los documentos. Los resultados señalan que las normativas de los países con víctimas mortales en atentados priorizan la vigilancia, buscan detectar la amenaza y la educación es secundaria. En cambio, los países sin víctimas mortales se centran en la seguridad y protección de la población, donde las referencias a la educación son prácticamente inexistentes. El análisis lexicográfico sobre la valoración de las 6 actitudes refleja que las más altas son: respeto, responsabilidad y tolerancia. Mientras que las más bajas son: autoeficacia y conciencia cívica. Se concluye que las políticas europeas sobre radicalización son débiles desde el punto de vista preventivo y no abordan las dificultades de identidad e inclusión que están en la raíz del problema. Además, aunque se considera que las políticas socioeducativas son un pilar para la inclusión, en la práctica limitan el papel de la escuela a la detección de brotes de radicalización y se evidencia la proliferación de prácticas que muestran la securitización de los sistemas educativos, que otorga responsabilidades preventivas a escuelas y universidades. Se sugiere promover políticas de inclusión holísticas y transversales, que desde un enfoque intercultural revaloricen el papel de la escuela, desvinculen la tarea educativa de las agendas de seguridad y se eviten las connotaciones políticas que impregnan el discurso preventivo de la radicalización.

Palabras clave: competencia global, actitud; PISA, educación cívica, educación intercultural, radicalización, extremismo, inclusión, democracia.

Introduction

Efforts to counter violent radicalisation in Europe have been addressed in official documents since 2005, with updates in 2008 and 2014 (Ruiz-Díaz, 2017) and 2020 (European Commission, 2020). European countries have respectively introduced measures to promote the inclusion not only of the immigrant population, but also of refugees and asylum seekers (Eurydice, 2019). This objective is in line with the aim of the Council of Europe, which originally set out to foster a European identity with a view to establishing greater unity among states and protecting fundamental freedoms and human rights (Council of Europe, 1949).

That is why Europe is facing significant challenges. The lack of trust in political processes, the political apathy of citizens, the lack of intercultural dialogue in culturally diverse societies and the rise in violent extremism are among the most critical threats to the values of freedom, citizenship and tolerance that lie at the very heart of Europe.

The 9/11 terrorist attack was a defining moment. Since then, Europe has perceived the terrorist threat to be a menace. Europe has also become a space where radicalisation and recruitment have thrived, and where the numbers of radicalised individuals have increased. Their profile is heterogeneous. However, they are connected by several characteristics such as religion and Islamic culture, socio-economic deprivation and cultural alienation (Municio, 2017). The radicalisation process revolves around a myriad of personal and structural factors such as socio-economic and cultural crisis, the need to belong in a disadvantaged environment and a lack of empathy with their situation or limited future prospects (Coolsaet, 2019).

Terrorist attacks have caused social upheaval, prompted a media backlash and posed a threat to traditional European values. Most terrorist attacks have been perpetrated by so-called “domestic combatants” influenced by the rhetoric of homegrown jihadism. They are predominantly second or third-generation European citizens of Muslim immigrants who have been born and raised in Europe (Municio, 2017). Meanwhile,

the so-called “indigenous” population views Muslim immigration with increasing suspicion (Cesari, 2013).

Counter-radicalisation therefore figures prominently at the top of international agendas. The UN endorses action to Prevent Violent Extremism through Education (PVE-E) (General Assembly, 2016). Simultaneously, western democracies need to respond to the extremist attacks carried out in the name of a religion or ethnicity (OECD, 2018a). Europe attaches importance to the protection of the European spirit and has devised a strategy of broad-ranging initiatives which highlights the importance of the role that education systems can play in the prevention of radicalisation.

In the wake of the terrorist attacks in Paris in November 2015, European education ministers convened to sign the “Paris Declaration” (Eurydice, 2016). The document sets out a number of shared aims and policies in support of integration, social cohesion and the prevention of radicalisation (Eurydice, 2019).

The concept of global competence is a construct that draws inspiration from the work of Lambert (1993) who, in the context of globalisation, promotes the idea that education should adopt a cosmopolitan outlook. In addition, although different models of global education, education for citizenship, democratic education, education for sustainable development and inter-cultural education are developed on the basis of different approaches (cosmopolitanism, human rights, environmental sustainability or cultural diversity), they share the objective of fostering understanding of the world and preparing individuals to make an active and transformative contribution to - and on behalf of - society (Sanz-Leal, Orozco and Toma, 2022).

On the basis of UN guidelines (General Assembly, 2016), the OECD has formulated its strategy to set out the learning approaches required in societies that are experiencing rapid and profound change and in which social and cultural diversity is restructuring countries and communities (OECD, 2018b). A new multidimensional and permanent learning objective, in the form of “global competence”, is set and assessed in the 2018 tests of the Programme for International Student Assessment (PISA) alongside the three standard fields of reading, mathematics and science. The aim is to assess the methods by which education systems prepare young people to embrace a diverse and peaceful society. Students are expected to learn how to converse, embrace other cultures, actively participate in social and political life and uphold principles of solidarity (OECD, 2018a, OECD, 2020).

PISA defines global competence in the following terms: “the capacity to examine global and inter-cultural issues, based on a support for human rights, in order to interact with people from different cultures, and to act for collective well-being and sustainable development” (OECD, 2018a: p. 4). Critics point to its evident Eurocentric approach (Auld and Morris, 2019; Grotlüschen, 2018), the lack of consensus and transparency around the framing of the concept (Engel, Rutkowski y Thompson, 2019), the challenge of assessing some aspects of the competence which diminishes its validity (Sälzer and Roczen, 2018) or that it is promoted along partisan lines with a view to legitimising the ideas that underpin the global competence model (Ledger et al., 2019; Robertson, 2021). In turn, while the indifferent and interchangeable identification of democratic competence and inter-cultural competence is criticised by Simpson and Dervin (2019), it is justified by Barrett and Byram (2020).

This study examines whether the global competence attitudes (OECD, 2018a) are considered in the counter-radicalisation regulations of 16 European countries. Secondly, an analysis is conducted to compare countries in which terrorist attacks have had deadly consequences, on the one hand, and those that have not, on the other.

Method

The research employs comparative methodology (Sartori and Morlino, 1994) based on two non-equivalent control groups.

Sample

The variables under analysis have been selected on the basis of the global competence descriptors (OECD, 2018a). They are thought to underpin the concept of democratic and inter-culturally competent citizenship, to express the intentions of governments and to shape domestic policies.

The conceptual framework of global competence was defined following a lengthy process of coordination involving the ministries of education of the member states of the Council of Europe. A total of 101 conceptual schemas of global, inter-cultural and civic competence were used, including 2,085 descriptors which were assessed and validated according to three criteria: clarity, precision and observability. The descriptors were statistically scaled according to the Rasch model

which was used to compare cultures. They were finally simplified into 20 multivariable elements including 3 sets of values, 6 attitudes, 8 skills and 3 bodies of knowledge (Council of Europe, 2016a, 2016b).

Analysing the multivariable elements of knowledge and skills has been ruled out as they have been part of educational programmes for longer periods of time (Naval, Print and Veldhuis, 2002). So too has analysis of values as, despite their importance, their assessment is particularly complex and they are not examined by PISA either (OECD, 2018a).

The analysis in respect of attitudes is justified because they are critical in adolescence and during school years (period in which principles and future moral standards are formed). Secondly, because education strategies that promote attitude change are the means by which to improve the capacity for dialogue, reflection and participation (García-López and Sales, 1998), they contribute to the construction of a European citizenship (Viejo, Gómez-López and Ortega-Ruiz, 2019) and, conversely, attitude changes may be a precursor to ideological changes which pave the way for violent radicalisation (de la Corte and Muro, 2020). Finally, because they do not tend to be included in intervention programmes (Burde et al., 2015). The particular multivariable elements connected with attitudes are therefore analysed: openness, respect, civic-mindedness, self-efficacy and tolerance, as conceptualised by the Council of Europe (Council of Europe, 2016a) and adopted by the OECD (OECD, 2018a).

The scourge of violent radicalisation is a reality facing all European countries, albeit to varying degrees of intensity (Nessert, 2018). It is assumed that the presence or absence of fatalities during terrorist attacks will mark a differentiating factor in the level of concern and public alarm and may set the tone of the message contained in official documents (Bermejo-Laguna, 2018). In light of this criterion, two groups are distinguished:

- The first group represents the counter-radicalisation plans issued by the governments of European countries whose national territories were affected by deadly jihadi attacks between 2015 and 2020. These countries are: Spain, Sweden, Germany, Denmark, Austria, Belgium, France, United Kingdom, and Finland (Table I).
- The second group encompasses the official counter-radicalisation documents of European countries in which terrorist attacks did not have deadly consequences between 2015 and 2020. These countries are: Albania, Lithuania, Portugal, the Netherlands, Switzerland, Slovenia and Norway, which represent different European cultural traditions (Mediterranean, Baltic, Balkan, Nordic and Central European) (Table II).

TABLE I. Official documentation (2015-2020) of European countries in which terrorist attacks have had deadly consequences

Year of publication	Official document	Country
2015	Plan estratégico nacional de lucha contra la radicalización violenta	Spain
2015	Prevent, preempt and protect. The Swedish Counter-terrorism Strategy	Sweden
2016	Federal Government strategy to prevent extremism and promote democracy	Germany
2016	Preventing and countering extremism and radicalisation. National Action Plan	Denmark
2017	The Austrian Strategy for the Prevention and Countering of Violent Extremism and De-radicalisation	Austria
2018	Le Salafisme en Belgique. Mécanismes et réalité	Belgium
2018	Prévenir Pour Protéger. Plan national de prévention de la radicalisation	France
2018	The United Kingdom's Strategy for Countering Terrorism.	United Kingdom
2020	National Action Plan for the prevention of violent radicalization and extremism 2019-2023	Finland

TABLE II. Official documentation (2015-2020) of European countries in which terrorist attacks have not had deadly consequences.

Year of publication	Official Document	Country
2015	Albanian National Strategy Countering Violent Extremism	Albanian
2015	Nutarimas dėl višojo saugumo pletros 2015-2025. Programos patvirtinimo	Lithuania
2015	Estratégia Nacional de Combate ao Terrorismo	Portugal
2016	National Counterterrorism Strategy for 2016-2020	The Netherlands
2017	National Action Plan to Prevent and Counter Radicalisation and Violent Extremism	Switzerland
2019	Resolucija o nacionalnem programu preprečevanja in zatiranja kriminalitete za obdobje 2019–2023	Slovenia
2020	Handlingsplan mot radikalisering og voldelig ekstremisme	Norway

Instrument

Analysis is carried out in two phases:

- Phase 1: Analysis of lexicographic content based on co-occurrence clustering or grouping techniques, because it displays the data and is suitable for comparative studies characterised by a large volume of digitised documentation. The lexicographic analysis software

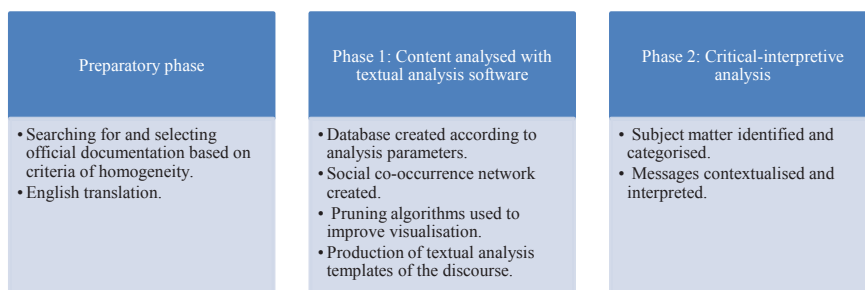
Iramuteq (*Interface de R pour les Analyses Multidimensionnelles de Textes et de Questionnaires*) is used. Lexical profiles - both of words and of lexemes - are assessed to analyse terms, to identify networks of correlations and similarities, and to create a hierarchical structure for the primary lexical worlds of discourse, such that the general semantics of the narration are identified. However, such a large volume of relational information is produced that it is not legible. Consequently, a pruning algorithm must be used (Kamada-Kawai, 1989) to display the relevant information. Finally, textual analysis templates including a quantitative and comprehensive description of the vocabulary are produced to facilitate the extraction of non-explicit information from the texts (Reinert, 1990).

- Phase 2: The study is completed by a critical and interpretative analysis of the documents. This required subject matters to be identified and the core messages of documents to be categorised and interpreted (Bardin, 2002).

Data collection and Analysis Procedure

The procedure specified in figure I has been implemented.

IMAGE I. Procedure implemented during the research project



Source: produced by the authors of this study

The software generates approximately 800 co-occurrences (lexical units within a text corpus, which have lexical similarity among the included forms). As the project involves data mining analysis, the 80 co-occurrences with the highest value have been selected to produce colour graphs in which the results of this research project are visually represented. The resulting information is relational between forms, based on research objectives. The software generates an image of ramifications of distinguished clusters, which unite related words in view of their proximity to the subject matter under study. The colours of clusters are random and distinguish common blocks. The greatest frequency of words is graphically represented by the largest size and the thickness of links shows the importance of their relationship: key words are in the graph nodes and reflect the co-occurrence between them.

Results

The graphs featured in Figures II and III have been produced on the basis of the analysis tool. Each image displays the network of similarities in such a way that it is possible to highlight the models or priorities that each set of countries has followed in relation to the prevention of radicalisation on their territory.

is where education and school are found. The size of these terms and their peripheral location suggest that they are secondary elements. While the term “radicalisation” is repeatedly referenced in all plans, the term “education” appears sporadically. This would indicate that its role is still embryonic and marginal. Although the documents of this group are qualified as preventive, the analysis shows that they place a considerable emphasis on security and that their message to citizens is geared towards security and protection.

FIGURE III. Network of common co-words generated on the basis of the documentation (2015-2020) of countries in which terrorist attacks did not have deadly consequences -Table I-



Source: produced by the authors of this study

The network of similarities between countries without fatalities is characterised by the core objective of security, both of territories and their citizens. “Security” is the most relevant word on account of its centrality and its size. On the other hand, they are aware of the threat and seek to keep extremism under control. This is also the location of programmes and public services which help to shape social policies and foster cooperation. However, references to education are practically non-existent and vague, and occupy residual positions.

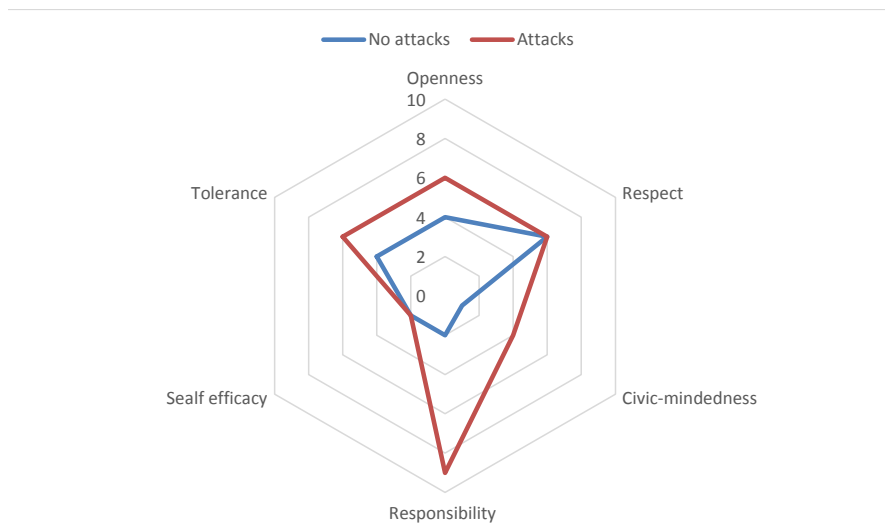
Table III outlines whether the documents include explicit references to global competence attitudes. The documents are considered in the chronological order of their publication. They are differentiated by colour: whether the terrorist attacks occurring on their territories have (red) or have not (blue) had deadly consequences. A network graph is included for the sake of clarity (Figure IV).

TABLE III. Inclusion of attitudes analysed in documents issued by European governments.

	Openness	Respect	Civic-mindedness	Responsibility	Self-efficacy	Tolerance
Spain (2015)		X		X		X
Sweden (2015)	X	X		X		X
Albanian (2015)		X				X
Lithuania (2015)		X		X	X	X
Portugal (2015)		X				
Germany (2016)	X	X		X		X
Dinamarca (2016)	X		X	X		X
Netherlands (2016)	X			X		X
Austria (2017)	X	X		X	X	X
Switzerland (2017)	X	X				
Belgium (2018)				X		X
France (2018)	X	X	X	X	X	
Reino Unido (2018)	X		X	X		X
Slovenia (2019)	X	X				X
Finland (2020)		X	X	X		
Norway (2020)	X	X	X		X	

Source: produced by the authors of this study

FIGURE IV. Presence of global competence attitudes in European documents.



Source: produced by the authors of this study

Figure IV shows the inclusion of the global competence attitudes, following the lexicographic analysis of the documents:

- The attitudes with the highest rating are responsibility, tolerance and respect which shape discourse in virtually all European countries. In respect of whether the presence of attacks with fatalities will mark a differentiating factor, there is a contrast in the attitude of responsibility, which includes the greatest disparity of results. While it is considered to be vital in counties where attacks have had deadly consequences, this is not reflected in counties where attacks have not resulted in fatalities. The former appeal to the responsibility of citizens, which is particularly evident in some sectors such as social workers, health workers and educators, who are tasked with detecting risk factors. However, responsibility is not a required attitude in countries where the attacks have not resulted in fatalities. It is only included by Lithuania and the Netherlands.

- The attitudes with the lowest rating are self-efficacy and civic-mindedness. In the latter, a difference is observed in the two groups of countries. Its presence is more prominent in countries with fatalities than in the other group, where it is only present in Norway, the country that has produced the most recent prevention plan (2020).

The critical-interpretative analysis of documents with references to prevention through education yields clear results.

As shown by Table I (countries with fatalities between 2015-2020):

The plan produced by Spain (Gobierno de España, 2015) focuses on public security and seeks to identify dangerous micro-scenarios. While it makes no explicit reference to the education system, it takes the view that it has a collaborative role to play.

Sweden (Government Office of Sweden, 2015) concludes that radicalisation is an insidious process that develops through social contracts with charismatic leaders. Young people are introduced to extremist groups through friends or family who already belong to these groups.

Germany (Federal Government, 2016) has produced a preventive programme in which references to school and family are among the 20 most commonly cited terms. It underscores the importance of a young person's education, as the majority of radicalised individuals in this country are between the ages of 18 and 24, and some 20% are between 12 and 17.

Denmark (Danish Ministry of Immigration, Integration and Housing, 2016) has devised a proposal which primarily aims at diverting young people away from radicalisation. As part of the proposal, a subject on human rights is added to the curriculum and counter-radicalisation initiatives and materials are proposed. It has introduced a scheme whereby a national group of professional mentors and instructors (parents) support families at risk.

As for Austria (Federal Ministry of the Interior of Austria, 2017), it has expressed concern about the rise in terrorist activity across its territory, especially among young people of an immigrant background. It is supportive of the idea that extremism can be countered by addressing the healthcare and educational needs of young people. It analyses the causes of radicalisation and identifies reasons for social and structural exclusion.

In Belgium (Veiligheid van de staat, 2018), the spotlight is placed on Salafism, which is hostile to western and democratic values. Its educational policies offer training programmes for teachers and students and a hotline is made available to report cases of radicalisation.

France (Gouvernement République Française, 2018) has a relatively ineffective plan in terms of prevention and makes no mention of integration or diversity. It primarily defends republican values, opts to secularise Islam and upholds secularism as a basic principle. It aims to detect cases quickly, given that extremists may live among its citizens, and provides a prevention guide for teachers outlining how to detect cases of radicalisation in schools. It has developed digital literacy and citizenship modules in a bid to counter the risk of radicalisation.

The United Kingdom (Her Majesty's Government of United Kingdom, 2018), a beacon of social and cultural diversity, does not qualify diversity as a strength. In 2015, it passed a law which legally requires schools, universities and teachers to prevent young people from being radicalised. Education and health systems are made subordinate to security agendas and rely on the cooperation of citizens who have a duty to remain vigilant and prevent. Its effects include "*Britishness*" whose aim is to promote British identity and values through education, as a way of fostering community cohesion (Matthews, 2016). The plan has sparked a public debate which is currently ongoing. While the plan is supported by some (Walker and Cawley, 2020), it is criticised by others the reason that it muzzles free speech in schools or universities (O'Donnell, 2016), undermines confidentiality and trust (Lumb, 2018), poses a threat to policies that promote equality (Jerome, Elwick and Kazim, 2019), and increases suspicion of some groups, not least young Muslims (Busher, Choudhury and Thomas, 2020).

Finland (Ministry of the Interior, 2020) stresses the importance of education, and especially early education, because it promotes the inclusion of minors. It endorses an educational and social well-being policy as well as a successful employment policy. It has set up multi-disciplinary task forces (educators, police officers, families, schools, etc.) to provide special support to teenagers who are at risk of being radicalised.

As regards the documents of the European countries in the second group (Table II):

Albania (Republic of Albania, 2015) is considered to be one of the most susceptible countries to radicalisation, given its geographic location and the fact that 50% of its population is Muslim. Albanian researchers suggest that the country is free from the threat of extremism in view of the inter-religious harmony that has traditionally existed there (Hide, 2015) and of the need for stability that its population so desperately craves (Vrumo, Lamllari and Papa, 2015). The plan supports the view that schools and teachers can stimulate cohesion and effectively contribute to counter-radicalisation efforts.

The Lithuanian strategy (Lietuvos Respublikos Seimas, 2015) includes succinct references to radicalisation. It takes the view that it poses a significant risk to public security and warns that cyberspace is a breeding ground for radicalisation.

Portugal (Conselho de Ministros do Portugal, 2015) has produced a vague plan which highlights the need for all sectors of civil society to work together and makes clear the challenge posed by the use of the internet in the radicalisation process.

The programme of the Netherlands (National Coordinator for Security and Counterterrorism, 2016) consists of preventive, repressive and corrective measures. Like social or healthcare services, the education system is viewed as a means of detecting suspicious behaviour. As for as education is concerned, the policy in relation to immigration has changed course. Funding has been diverted away from some programmes which seek to promote inclusion in schools and equity in education for children of immigrants, for instance the remedial initiatives intended for disadvantaged children of immigrant backgrounds under the Early Childhood Education Intervention Programmes, and language and culture courses.

Switzerland (Swiss Security Network, 2017) has devised a preventive plan setting out initiatives to raise awareness of national identity, promote research and foster inclusive education in schools and universities. It states that individuals can be radicalised by their friendships and online interactions.

Slovenia (Republike Slovenije, 2019) notes that radicalisation clearly represents a cross-border risk. Some factors, such as geographic location, background and culture or ethnicity of the population represent a significant different in respect of other European countries.

Norway (Justis og beredskapsdepartementet, 2020) has adopted a holistic approach with an emphasis on prevention and working with young people. Schools are the medium through which students are taught about democracy and they undertake initiatives to train teachers, promote the use of digital resources, enhance terrorism resilience, etc. Norwegians have long echoed the concerns of their Scandinavian neighbours, in so far as they relate predominantly to the supremacist threat.

Conclusions

The comparative methodology with two phases of analysis is appropriate because it addresses crux of the matter and the key elements of the documents. The combination is complementary and adds balance to the research. The lexicographic analysis with Iramuteq provides rigour, objectivity and graphical visualisation. It is further enhanced by the critical and interpretative analysis which serves to contextualise the documents and adds depth.

In light of the conclusions drawn from the study of the extent to which global competence attitudes are considered by 16 European countries, it is possible to formulate recommendations for the improvement of counter-radicalisation policies through education:

Firstly, it is concluded that European policies on radicalisation are defective in terms of prevention and fail to address the issues of identity and inclusion, which are at the root of the problem. While countries from the first group - where the terrorist attacks have deadly consequences - prioritise vigilance and seek to detect the threat, countries from the second group - where attacks did not have deadly consequences - focus on security and protection of population. They all tend to adopt “hard” prevention strategies (Sjøen and Jore, 2019) which occasionally have adverse effects both on young people who are viewed with suspicion, and on some communities, not least Muslim communities, which are stigmatised (Ragazzi, 2017).

According to Innerarity (2006), Europe has become a paradigm and an “integration laboratory”. This marks the beginning of the challenge facing the European citizen of the 21st century. We live in a multi-ethnic society where the concept of citizenship has evolved from the idea of

national citizenship which revolves around shared cultural identities to one which links solidarity between communities to civic and democratic values (Innerarity and Acha, 2010). These circumstances call for “ethical humanism” which promotes “responsibility towards the other” and “consideration for the diverse” (Bauman, 2012). In this respect, Thoillez (2019) notes that relations built on recognition and communication are more likely than a respect for individual freedom, as enshrined in law, to create an environment in which the characteristics and attributes of others are recognised, valued and respected.

The concept of inclusion is a two-way street. It concerns all parties exposed to different cultures in this new context and requires integration models to prioritise an inter-cultural approach. If the identity of a specific population was once defined by culture, nation or religion, this definition is no longer fit for purpose. Inclusion implies a positive assessment of difference whereby social, cultural and political structures are subordinate to respect, acceptance and recognition of the other as a human being whose intrinsic dignity takes precedence over social consideration.

It is difficult to combine European identity with other cultural, national, racial and religious identities. Society is in a process of transformation, the future result of which is far from certain. However, a statistical relationship does not always exist between education and the rejection of violence and extremism (Gielen, 2017). Brockhoff, Krieger and Meierrieks (2015) state that, while education has a key role to play in mitigating the risks of radicalisation, its impact is actually subject to a number of factors, and educational measures ought to go hand-in-hand with improvements in socio-economic, politico-institutional and demographic spheres. If these spheres are unfavourable, education may lead directly to terrorism and increase feelings of frustration and humiliation. According to Aly, Balbi and Jacques (2015), radicalisation is a complex phenomenon which requires cross-cutting and comprehensive preventive measures.

Secondly, the consideration given to education is either secondary (countries with fatalities) or practically non-existent (countries without fatalities). In theory, socio-educational policies have a fundamental role to play in addressing the issue of integration (Eurydice, 2016, 2019). However, in practice, the analysis concludes that the documents reduce education and the school to a relatively insignificant role and limit their preventive function to the detection of the first signs of radicalisation. It should be noted that the documents produced in 2020, such as those

issued by Finland and Norway, adopt a more comprehensive and inter-disciplinary approach to prevention, to the extent that while educational measures continue to be subordinate to security agendas, they at least exist in greater numbers and are developed in a more exhaustive manner.

As indicated by Musaio (2021), an “inter-cultural citizenship” project is needed to shape the inter-cultural approach to services which protect the human rights of the most vulnerable, and to promote inclusive education practices. Thus, education encourages pupils to accept personal identities and “otherness” of the other in advance of the recognition of their cultural background (Merino-Mata, 2004). Similarly, Balduzzi (2021) highlights the mission that schools can undertake as an “educational community” which contributes not only to the development and personal improvement of pupils, but also to the construction of a shared cultural project.

Our proposal notes that the preventive task requires an unambiguously inter-cultural approach which facilitates inclusion and constructs, in practice, a democratic citizenship. School creates a stronger sense of belonging, shapes personal identity, increases resilience, raises awareness of democratic practices and promotes the public good and the pursuit of a shared future beyond the context of education. Alongside families, schools can act as a conduit through which to create a fairer society. During our school years, we form the principles which will shape our lives moving forward and are exposed to the ideal environment in which to normalise behaviours which create emotional bonds and friendships between pupils. An inter-cultural school paves the way for a democratic culture which helps to forge a relational and social sense of existence itself. School facilitates contact among equals; it enables different individuals to form relationships and interact; and it teaches pupils to value different identities and to develop the skills they need to converse with others. Miguel-Luken and Carvajal (2007) point out that, as school is a space in which individuals are required to co-exist, it represents an environment where they can become known to and valued by others, regardless of their origin. More often than not, difficulties arise in other spaces of co-existence where interaction is neither present nor promoted, and where it is easier for prejudices to take hold. Exposure to different cultures in these spaces of co-existence enables teenagers to accept customs, languages, ethnicities and religions different from their own, so much so that these situations shape their personality (Azmitia,

Ittel and Radmacher, 2005), and teach them to compromise in order to resolve a dispute and to show greater sensitivity to differences based on diverse cultural perspectives (Villalobos-Carrasco, Álvarez-Valdivia and Vaquera, 2017). Moreover, as school not only fosters interaction between different groups, but also social mixing (Thoillez, 2019), pupils will develop better social skills and be more likely to succeed in the future (Checa and Arjona, 2009). However, schools are not immune to cultural tensions. It is preferable to avoid situations in which pupils of immigrant backgrounds or from stigmatised groups are predominantly allocated places in particular deprived areas and education centres (Ponce, 2007). Segregation in these schools goes hand-in-hand with disadvantaged socio-economic circumstances which act as a barrier to inclusion and makes these establishments prone to the risk of radicalisation.

Thirdly, the close links between security and education have received widespread political support (Durodié, 2016). Responsibility is the most relevant attitude in the documentation and shapes the discourse of preventive policies in the European countries of the first group - table I. This approach is far removed from the ethical focus of responsibility (Bauman, 2012) and points to the subordination of education systems to security agendas, whereby preventive responsibilities are assigned to schools and universities. That is why several countries require teachers to monitor risk indicators with a view to detecting cases of radicalisation, based on a prevention guide for teachers and headteachers. This form of vigilance has become a legal requirement in the United Kingdom. Belgium and France are also developing systems in which educators will be expected to detect signs or cases of radicalisation and these concepts are spreading to other countries such as Sweden and Spain.

It is widely accepted that the presence of fatalities in terrorist attacks not only increases suspicion and social hostility, but also causes European governments to prioritise counter-radicalisation policies: every country in which attacks have had deadly consequences have developed preventive plans and civic integration programmes. However, this is not the case in counties without fatalities. Only Switzerland and Norway have devised plans similar to those of countries from the first group. In all the others, while references to radicalisation are included in security and counter-radicalisation strategies, they do not amount to preventive plans per se. It should be noted that, in the case of Albania and Slovenia, whose populations are characterised by a high percentage of Muslims

and where inter-religious harmony has traditionally existed, they view radicalisation as a cross-border rather than an internal political issue, which is why matters of radicalisation are included in general strategies.

That is why it is preferable to make education independent of security agendas and guard against political undercurrents which permeate counter-radicalisation discourse. The subordination of education systems to security agendas has been deeply criticised in Europe, where individual freedoms and rights are deemed to be fundamental. However, academic literature on education and security studies has recently indicated that, even from opposing points of view, the subordination of education systems to security agendas is not an unfamiliar concept and illustrated the point with some past cases (Gearon, 2015; Stonebanks, 2019).

The analysis considers the extent to which it may be appropriate for European radicalisation policies to consider an integrated approach with cross-cutting policies, where social aspects take precedence over security agendas and where the issues of identity and inclusion are addressed. It is also suggested that preventive policies should afford schools a greater role, such that, as part of an inter-cultural strategy that is independent of security agendas, they are in a position to contribute to the creation of societies that are more cohesive, more democratic and inclusive, and more resistant to extremism. Schools are spaces in which humanity should be allowed to flourish.

Limitations and outlook

This research is limited to an extent, for instance in respect of the numerous languages in which the documentation is produced. As all the documentation had to be standardised with a translation into English, some important nuances may have been lost in translation. We also found it particularly difficult to access this documentation and find the latest versions, as the speed with which the wheels of domestic legislation turn varies from one country to the next.

Prospective analysis may enlarge the analysed sample of countries and European regions and may even incorporate new categories of analysis. It would also be appropriate to consider the autonomous communities and European regions which have their own special regulations in this respect.

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Research informed educational practice: how to help educators engage with research for the common good¹

Práctica educativa informada por la investigación: cómo ayudar a los educadores a comprometerse con la investigación para el bien común

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Abstract

This paper examines research informed educational practice (RIEP) and how RIEP can become an integral part of how education systems operate. For the purposes of this paper, we define RIEP as the use of academic research by teachers and school leaders in order to improve aspects of their teaching, decision-making, leadership or ongoing professional learning. First RIEP is considered within the broader context of ‘research for the common good’. The paper then discusses how, despite the benefits and imperatives associated with

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RIEP, there is still a gap between educational research and educational practice. Considering the extant barriers to RIEP, the paper then concludes with a discussion of the types of ‘universal’ initiatives that can foster RIEP, regardless of the contextual factors operating at the system-level. In short, we argue that RIEP can materialise subject to: 1) effective capacity building to enhance teachers’ research literacy (including within initial teacher education and continuing professional development activity); 2) Top-down initiatives that promote RIEP-centred collaboration between practitioners and practitioners, and practitioners and research/researchers that enable teachers to become partners in the research production process and ensure universities are engaged in practice focused research production and 3) the expectation that school leaders are responsible for implementing collaborative inquiry, focused approaches to RIEP, within their school. Finally, we also suggest these three factors need to be reinforced with consistent support from macro and meso level actors. Consistent support from macro and meso level actors (such as district leaders) in relation to each of the three aspects detailed above, including in terms of governance and accountability. In other words, RIEP is not derailed by new and conflicting initiatives, and is reflected in key structures affecting how schools operate.

Key words: Research informed educational practice, teacher education, education policy, common good.

Resumen

Este estudio examina la Práctica Educativa Informada por la Investigación (PEII) y cómo la PEII puede convertirse en una parte integral del funcionamiento de los sistemas educativos. Para los propósitos de este estudio, definimos PEII como el uso de la investigación académica por parte de docentes y líderes educativos con el fin de mejorar aspectos de su enseñanza, toma de decisiones, liderazgo o aprendizaje profesional. En primer lugar, la PEII se considera dentro del contexto más amplio de “investigación para el bien común”. En segundo lugar, el estudio analiza cómo, a pesar de los beneficios e imperativos asociados con la PEII, todavía existe una brecha entre la investigación y la práctica educativas. Teniendo en cuenta las barreras existentes para la PEII, el artículo concluye con una discusión de los tipos de iniciativas “universales” que pueden fomentar la PEII, independientemente de los factores contextuales que operan a nivel del sistema. En resumen, argumentamos que la PEII puede materializarse en relación con: 1) Desarrollar la capacidad del maestro en el área de la alfabetización en investigación (incluso dentro de la formación inicial de maestros y la actividad de desarrollo profesional); 2) promoción de arriba hacia abajo del uso de la investigación que garantizan que la actividad de la PEII se lleve a cabo dentro de un entorno más amplio de apoyo mutuo y que surja una cultura de PEII en todos los actores clave del sistema; y 3) Estrategias y políticas de arriba hacia abajo que posicionan a los líderes escolares como responsables de implementar enfoques

colaborativos y centrados en la investigación para la PEII dentro de su escuela. Por último, también sugerimos que estos tres factores deben reforzarse con el apoyo constante de actores a nivel macro y meso, incluidos aspectos vinculados a la gobernanza y la evaluación. En otras palabras, PEII no está afectada por iniciativas nuevas o en tensión y está reflejada en las estructuras claves del funcionamiento del centro.

Palabras clave: práctica Educativa Informada por la Investigación, formación del profesorado, política educativa, bien común.

Introduction

This paper explores research informed educational practice (RIEP) and what is required for RIEP to become an integral part of how education systems operate. RIEP is first considered within a broader framework of how ideal societies are supposed to operate: in other words, through the utopian lens of ‘research for the common good’. The paper then discusses how, despite the benefits associated with RIEP and the moral imperative that educationalists should engage with research evidence, there is still a gap between the two worlds of educational research and educational practice. The paper then considers the extant barriers to RIEP, before concluding with a discussion of the types of ‘universal’ initiatives that can foster RIEP, regardless of the macro-level contextual factors affecting the operation of education systems. In short, we argue that RIEP can materialise subject to: 1) effective capacity building to enhance teachers’ research literacy; 2) top down promotion; 3) and the formal expectation that school leaders are responsible for implementing collaborative, inquiry focused approaches to both RIEP and educational innovation within their school. Finally, we suggest that these factors need to be reinforced by consistent and stable support from both macro and meso level actors.

Research use: the utopian ideal

In etymological terms, the word utopia actually means ‘non-place’. But if we read the initial ‘u’ as a Greek ‘eu’, the meaning of the word

transforms into ‘excellent place’. Writing in 1516, Thomas More played on this ambiguity to present a fictional account of a journey to a newly discovered island, *Utopia*, which he used to establish his vision of a ‘rational’ society (More, 2012). The purpose of education in Utopia is to produce good citizens. By this, More means that it should instil ‘principles that benefit the life of the community’. Such principles include freedom of speech, as well as tolerance of other beliefs. Of course, the notion of utopia is not new: thinkers have been conceiving of ideal societies for more than 2,500 years. For example, the *Analects of Confucius*, written by Chinese philosopher Confucius (551-479BC), propose a harmonious society where rulers enforce justice and subjects pay taxes (Claeys, 2020). Likewise, in the 1st Century, historians Plutarch and Tacitus both depicted societies in which simpler cultural values brought about a way of life conducive to virtue and decency. For example, in the *Life of Lycurgus*, Plutarch considers the origin of Sparta (from which came the notion of spartan living); the *Germania* of Tacitus, meanwhile, deals with contemporary life of tribes on the outskirts of the Roman Empire (Claeys, 2020; Eco, 2015). Other more recent examples of such societies include Campanella’s (1602) *City of the Sun*; Bacon’s *New Atlantis* (1629) and Harington’s *Oceania* (1656). Shakespeare’s *The Tempest* contains similar motifs; while Gulliver’s Travels (1726) also takes a well-worn path of a traveller’s story, to depict the follies and downsides to our own community in a distorting mirror.

We can learn a lot about the notion of ‘research for the common good’ by engaging with such texts. For example, the Muslim philosopher Ibn Sina (980-1037) imagined a future world based on the liberated intellect where rationality (informed by knowledge and truth) reigned supreme (Claeys, 2020). In a similar vein is Plato’s *Republic*: a society in which truth is actively sought out and valued (Plato, 2007). These notions provide the basis for Francis Bacon’s *New Atlantis* (Bacon, 2008). Central to the narrative and to the success of the society described by Bacon is *Salomon’s House*, a centre for scientific research. In *Salomon’s House* the experimental method is given maximum encouragement, with the aim of establishing ‘the knowledge of causes and secret motions of things, and the enlarging of the bounds of human empire, the effecting of all things possible’. In principle, this involves experimentation to improve the quality of foods, medicines, manufacture and the study of science: with the paternalistic nature of Bensalem’s government meaning that all

research is undertaken fully in the public interest (Claeys, 2020). Other conceptions of utopia place a premium on different ideals, including the role of community and communal behaviour. For instance, in his treatise *The Politics*, Aristotle (385-323 BC) explores how society should be ordered to best ensure the happiness of individuals (Aristotle, 1992). While some of Aristotle's ideas regarding tyranny and slavery are now rightly consigned to the trash heap, the importance of citizenship, community (the *polis*) and the ability to exchange both ideas and goods (which occurred in the *agora*) still remain desirable today.

In the modern age, while not a utopian text *per se*, the work of German sociologist, Jürgen Habermas also adheres nicely with many of the principles above. Habermas was principally concerned with how rational decision-making can be facilitated in modern democratic societies. Habermas's ideas are dependent on his theory of 'communicative action'; action oriented towards reaching agreement, which, Habermas contends, is *the* fundamental type of social action. In turn, communicative action depends on a further premise; the notion that discourse is used by people as an everyday process of making claims to validity. These two premises enable Habermas to conceive of civic life as comprising networks of relationships that display two principle characteristics: firstly they are cooperative – this is because the success of any interaction depends upon the interdependent activity of both narrators and audiences; secondly that discourse must have a rational dimension: a narrator will seek to provide reasons for the validity of their communicative act, knowing that their counterpart (the audience) may either accept it or counter it with a better argument. Habermas's twin premises of mutual agreement and discursive validity also allow him to set out a vision which positions valid and rational arguments as the basis for all major decisions. In other words, in a Habermasian-based society, public acts of praxis are ultimately determined by what Habermas describes as the force of the better argument, which represents a cooperative and knowledge-informed search for truth (1999).

Research informed educational practice

In education, we can translate these ideals into the notion of Research Informed Educational Practice (RIEP). For the purposes of this paper,

we define RIEP as the use of academic research by teachers and school leaders in order to improve aspects of their teaching, decision-making, leadership or ongoing professional learning (Brown, 2020; Walker, 2017). There are strong reasons to encourage this extant conception of research for the common good. For instance, a nascent evidence base indicates that, if educators engage with research-evidence to make or change decisions, embark on new courses of action, or develop new practices, then this can have a positive impact for both teaching and learning (e.g. Cain, 2015; Cordingley, 2013; Godfrey, 2016; Mincu, 2014; Rose *et al.*, 2017). There are also a myriad of social and moral imperatives which, together, present the case that educators ‘should’ engage with research-evidence if it is possible for them to do so. This argument is nicely encapsulated by Anne Oakley, who some 20 years ago argued that: ‘those who intervene in other people’s lives [should] do so with the utmost benefit and least harm’ (2000: 3). Oakley thus contends that there exists a moral imperative for practitioners to only make decisions, or to take action, when armed with the best available evidence. In other words: ‘we [all] share an interest in being able to live our lives as well as we can, free from ill-informed intervention and in the best knowledge we can gather of what is likely to make all of us most healthy, most productive, most happy and most able to contribute to the common good’ (2000: 323).

The occurrence of RIEP

Nonetheless, despite this growing body of evidence and these extant imperatives, to say nothing of the dedicated efforts of a range of organisations, movements and academics to foster research-informed practices, RIEP – as a ‘business as usual’ way of working – is yet to take hold in the vast majority of schools; in either Spain or England (the home countries of the authors of this paper), or indeed more widely (Biesta *et al.*, 2019; Graves & Moore 2017; Wisby & Whitty, 2017). Instances of this ‘research-practice gap’ can be found in the findings of a mixed methods study undertaken by Coldwell *et al.*, (2017) to examine England’s progress towards a research-evidence-informed school system. Coldwell *et al.*’s (2017: 7) analysis suggests that educators generally did not feel confident in using research-evidence and that there was ‘limited evidence from this study of teachers directly [using] research findings to change

their practice'. Later work, such as the recent survey of 1,670 teachers in England undertaken by the National Foundation for Educational Research, also presents a similar picture. Here it was found that academic research had only a 'small to moderate' influence on teacher decision making. Instead, teachers were in fact much more likely to draw ideas and support from their *own experiences* (60 percent of respondents identified 'ideas generated by me or my school'), or *the experiences of other teachers/schools* (42 per cent of respondents identified 'ideas from other schools') when deciding on approaches to improve student outcomes. In addition, *non-research-based continuing professional development (CPD)* was also cited as an important influence (54 percent of respondents). These compare to the much lower figures of 13 percent and seven percent for 'sources based on [the] work of research organisations' and 'advice/guidance from a university or research organisation', respectively (Walker *et al.* 2019). A similar picture emerges when we explore the Spanish context. For instance, in a recent study conducted with teachers in Madrid and Catalonia, 68.1% of teachers and 77.3% of school heads declared that they frequently or always engaged with research (Ion and Gairín, 2019). Yet when it came to actually engaging in innovation and pedagogic development, however, teachers acknowledged limited use of scientific evidence: preferring instead to rely on experiential and peer knowledge (Ion *et al.*, 2019).

Barriers to RIEP

Using research-evidence to facilitate educational improvement typically involves educators (either collectively or individually): 1) accessing academic research; 2) being able to comprehend academic research; 3) being able to critically engage with research-evidence, understanding both its strengths and weaknesses, as well as how its warrants for truth can be justified; 4) relating research-evidence to existing knowledge and understanding; and, where relevant, 5) making or changing decisions, embarking on new courses of action, or developing new practices based on a combination of research findings, practical knowledge and contextual understanding. Reasons traditionally given for the disconnect between research and practice invariably relate to each of these five steps. For example, in terms of steps 1) and 2), it has been suggested

that educators can often struggle to get hold of academic research, which is typically situated behind pay walls (Goldacre, 2013). It can also be hard for educators to engage with academic research, due to the esoteric nature of the language used (Cain *et al.*, 2019; Goldacre, 2013; Hargreaves, 1996). With regards to step 3) (critical engagement with research), teachers indicate that they often feel unprepared to use research information or even to conduct inquiry processes about their practice (Ion & Lopez, in press). In particular, teachers express concerns regarding their research literacy, and their own skills to use and produce research (Olmos & Pattier, 2021). Step 4), meanwhile (relating research-evidence to existing knowledge and understanding), can be problematic if academic research is either too context independent or when it reports on very specific contexts; both situations meaning educators can find it difficult to know how best to apply findings to their settings (Biesta, 2007; Cain *et al.*, 2019; Wrigley, 2018).

Finally, step 5) is often hindered as a result of both practical and methodological concerns. Beginning with the former, and an often-cited reason for the research-practice gap is that teachers and school leaders do not always have enough time to engage with research (Brown, 2020; Brown & Flood; 2019; Brown and Greany, 2021; Galdin-O'Shea, 2015). But a lack of time is the result of school leaders prioritising other activity over and above RIEP. It is instructive, therefore, to consider studies undertaken in the tradition of institutional theory, which indicate that, when seeking to solve problems, educators often privilege legitimacy: i.e. acting according to public expectations of what is appropriate, over effectiveness (Mintrop & Zumpe, 2019). For instance, in high autonomy/high accountability systems, such as England, educators are more likely to focus more on the short-term requirements of accountability and performativity; and not REIP related processes, which tend to require a longer term time scale (Cain *et al.*, 2019; Mintrop & Zumpe, 2019). Alternatively, in systems where there is high regulation, such as Spain, REIP will not occur without the presence of government policies, initiatives or curricula materials which explicitly promote the use of research by teachers. Methodological issues related to step 5), meanwhile, centre on critiques of the quality of educational research, as well as the concomitant suggestion that it should not be trusted to provide a firm basis for practice development (Biesta, 2007; Goldacre, 2013; Hammersley, 1997; Hargreaves, 1996; Wisby & Whitty, 2017).

And then of course, we have to consider the motivation for educators to want to engage with research in the first place (Malin, Brown, Ion *et al.*, 2020). Motivation can have a range of aspects. For instance, recent studies suggest that Spanish teachers tend to view academic research as being disconnected from educational practice and epistemologically opposed to their needs. In other words, findings indicate that teachers do not view research as a viable source of knowledge: it is perceived as too abstract, too far removed from their teaching practice and so useless for their daily needs (Murillo and Perines, 2017; Murillo, 2006). From a psychological perspective (e.g. from the perspective of *Expectancy Value* theories), this would suggest both the expectation for success (e.g., the perceived possibility of positive benefits), and the subjective value of engaging with research, may often be considered by teachers as low: hence there can be an absence of RIEP-related behaviour. Furthermore, motivation can also have an emotional aspect. For instance, leading design academic, Donald Norman (2013: 47) argues that ‘the emotional system is a powerful information processing system...that determines whether a situation is safe or threatening, whether something that is happening is good or bad, desirable or not.’ In tense and threatening situations, the emotional system will trigger the release of hormones that bias the brain in preparation for action. In calm, non-threatening situations, the emotional system triggers the release of hormones that bias the brain towards exploration and creativity (Norman, 2013). A positive emotional state is therefore ideal for reflective thought, while a brain in a negative emotional state provides focus: precisely what is needed to maintain attention on a task and finish it (Brown *et al.*, 2021). Too much of either, however, results in tunnel vision, where people are unable to look beyond a narrow range of options (Norman, 2013). This perspective links nicely with the educational perspectives provided by Schildkamp and Datnow (2020), who argue that when it comes to research use, how practitioners view the purpose of RIEP is vital: with RIEP efforts focused on accountability being far less fruitful than those focused on continuous improvement, or an explicit focus on equity and expanding students’ opportunities to learn. Likewise, when teachers experience negative experiences with RIEP, such as shaming and blaming or feel that their time is being wasted, they are far less likely to be engaged. Positive experiences, on the other hand, (for example, working with a productive

team that is delving deeply into learning) are likely to encourage teachers to become more engaged (Schildkamp and Datnow, 2020).

Attempting to overcome these barriers

At the same time, there have been a range of national and local initiatives which have attempted to address the separations between research and practice. Most recently, in England, these include the establishment of the Education Endowment Foundation (EEF): a ‘what works’ centre for education, which provides freely available and accessible summaries of what works research-evidence for educators to use. In addition to this substantial investment, in 2014 the EEF launched a £1.4m fund for projects to improve the use of research in schools. This initiative was followed up in 2016 with the launch of the EEF’s *Research Schools* initiative; schools charged with leading RIEP development in their local area. There has also been a substantial rise in bottom-up/teacher-led initiatives, such as the emerging network of ‘Teachmeets’ and ‘ResearchED’ conferences (Wisby & Whitty 2017), designed to help teachers connect more effectively with educational research. Furthermore, a prominent example of a teacher-led initiative was the 2017 launch of England’s Chartered College of Teaching: an organization led by and for teachers and whose mission, in part at least, is to support the use of RIEP (Wisby & Whitty 2017). RIEP is also increasingly promoted and supported at a government level. For example, England’s Department for Education ensured the inclusion of references to RIEP within its standards for school leaders and in the pilot Early Career Framework for newly qualified teachers. Finally, the periodic Research Excellence Framework (the ‘REF’), via which UK universities are funded, now requires them to account for the ‘impact’ their research has had on, ‘the economy, society, culture, public policy or services ... beyond academia’ (HEFCE 2011: 48). In other words, the government’s aim is to use REF to encourage universities to ensure that their research is used in the world beyond academia, for example, by directly working with teachers and schools (Cain *et al.* 2019).

In the Spanish context, meanwhile, the notion of ‘evidence informed practices’ has not only entered into the public discourse, it has also started to be operationalised vis-à-vis school practice. For instance, in Catalonia, one of the Spanish autonomous communities, the recent Education

Act (Decret 274/2018), marked a milestone in policy making, with its incorporation of a visible and formal commitment to the promotion and use of research in the educational school practice. This is nicely reflected in the declared aim of the Act, where it is stated: ‘With this strategy [of developing evidence informed schools] Catalonia makes a leap in the articulation of an ecosystem that bring together the set of educational agents and research groups from the universities who are already working on it, promoting and recognizing the academic talent that exists in the country and putting it at the service of improving education in Catalonia’ (Department for Education, 2018). Furthermore, research is understood as a driver of educational improvement that requires collaboration between researchers and practitioners if it is to be achieved. Such collaboration has been facilitated with the proposal of the ‘Schools of Evidence’² strategy, jointly with the Catalan Institute of Public Policy Evaluation (*Ivàlua*) and the *Jaume Bofill Foundation*. The objectives of the program were to: a) collect, disseminate, and generate solid evidence on educational policies and practices, including with regards to effectiveness and efficiency; b) create opportunities to share and transfer knowledge about what works to improve education; c) instigate pilot initiatives based on evidence, and d) promote an assessment culture and the practice of controlled and rigorous experimentation within the Administration and the educational community, connecting decision-making processes with international evidence-based/informed trends.

Steps towards RIEP, have been made also by private foundations. For instance, programmes such as ‘What Works in education: evidence for the educational improvement’³ is one of the first initiatives focused on providing, to the education community, scientific evidence based on systematic reviews and rigorous programmes evaluations. Its objective is to collect, summarize and share international evidence about effective international educational policies and practices, including recommendations for how they can be implemented within in the Catalan Educational System. The programme also includes a biannual publication of two systematic reviews on a specific topic, as well as seminars open to the educational community. Another initiative is the EduCaixa programme, promoted by LaCaixa bank foundation, which

² At the date of the publication of the present paper, this initiative was not implemented

³ See: <https://ivalua.cat/ca/projecte-tematic/educacio/que-funciona-en-educacio>

offers the resources from England's *Teaching and Learning Toolkit* and *The Best Evidence in Brief*, translated into Spanish and Catalan.

Research for the common good

Nonetheless, despite the presence of these initiatives, the evidence-practice gap shows no sign of narrowing. This would imply that what has been instigated to date, is not fully 'hitting the mark'. In other words, that there are a range of factors preventing RIEP which are still unaddressed. So how can such issues be resolved? In part, the factors affecting the presence of RIEP are systematic in nature. It goes without saying that, globally, school systems differ, both contextually and structurally, across a myriad range of elements. At their most simplistic, we can identify these elements as relating to the level of social cohesion in a system and how regulated a system is. Here, *social cohesion* refers to the institutions, norms and networks that bind societies together. Systems with high social cohesion have a higher propensity and readiness to engage in collaboration. Low socially cohesive systems, on the other hand, are those in which there are high levels of deregulation and privatisation. Regulation, meanwhile, refers to the institutions that determine control and accountability. In a high regulation system, there is typically a dominant, hierarchical culture and associated bureaucratic controls. High regulation systems often also typically involve 'high stakes' accountability systems: i.e. systems in which not meeting particular standards can incur major penalties. By contrast, systems displaying low social regulation typically evidence much flatter, non-hierarchical cultures, with improvement achieved through partnership rather than, for example, top-down accountability.

Combinations of high/low social cohesion and high/low social regulation necessarily result in four types of educational system (Hood 1998). In more detail, these are: 1) *fatalist* systems, those characterised by rule-bound approaches to organization, with little cooperation related to achieving sought-after outcomes; 2) *hierarchist* systems, which display social cohesion and cooperation in order to meet rule-bound approaches to organization (and which are often characterised by bureaucracy); 3) *individualist* systems, which utilise atomised approaches to organization. For instance, bargaining/negotiation between actors; and 4) *egalitarian* systems. This latter type are characterised by high participation structures,

with all decisions being ‘up for grabs,’ combined with an egalitarian culture and peer-to-peer support. While classifying systems in this way is useful for understanding what factors affect RIEP across different system types, it also enables to ascertain, in a more systematic fashion, what factors and solutions might aid RIEP across all system types. In other words, it enables us to identify the universal strategies that might promote RIEP globally.

In particular, recent reviews of education systems based on this typology have explored some 25 case studies of education systems, from across five continents, and covering the entire range of system types (Malin, Brown, Ion et al., 2020; Brown and Malin, 2022). Case study authors were asked to situate their system within the typology above, before applying a common analytic framework to describe RIEP-related patterns within their contexts. Vitaly, a subsequent cross-case analysis of these 25 cases suggests that the combination of the following four factors can encourage RIEP no matter what the system:

1. Building educator’s capacity in the area of research literacy (including within initial teacher education and continuing professional development activity). This helps ensure teachers can engage with research and data, so improving the likelihood they will do so;
2. Top-down initiatives that promote RIEP-centred collaboration between practitioners and practitioners, and practitioners and research/researchers. Likewise, initiatives that enable teachers to become partners in the research production process and ensure universities are engaged in practice focused research production. Such initiatives, ensure RIEP activity takes place within a wider environment of mutual support, and that a culture of RIEP emerges across all key system actors;
3. Top-down strategies and policies that position school leaders as responsible for implementing collaborative, inquiry focused approaches to RIEP within their school. In other words, RIEP becomes a formal responsibility of school leaders and so is attended to; and
4. Consistent support from macro and meso level actors (such as district leaders) in relation to each of the three aspects detailed above, including in terms of governance and accountability. In

other words, RIEP is not derailed by new and conflicting initiatives, and is reflected in key structures affecting how schools operate.

We now conclude by discussing each of these factors in detail, below.

Discussion

What is clear from this list is that achieving teachers' engagement with research is a multidimensional challenge and includes co-responsibility from both research producers and research users and multilevel collaboration between all actors involved. At the level of the individual level, RIEP requires a certain level of research literacy (Flores, 2018). This is needed if teachers are to engage effectively with research data and research informed resources, if they are to display positive attitudes towards research (and overcome epistemological barriers) and if they are to be motivated to engage with it (i.e. see its potential benefits) (Ion & Lopez, in press). Here the role of universities is key, and the role of researchers critical. Specifically, it means there is an onus on researchers to build their capacity to engage in meaningful dissemination, transfer, and research mobilisation. For instance, moderating technical language, and instead, showing how findings can be applied to specific contexts. User engagement is also vital, and researchers need to create room for teachers in their projects and initiatives: involving teachers in the co-design and co-conducting inquiry process with researchers can both stimulate their interest and motivation for research (Oancea, 2014). Furthermore, a 'third space' is required in which both researchers and teachers are respectful of one another's professional cultures and traditions but are, simultaneously, oriented towards understanding that research is part of both social development and the public good (Brown and Greany, 2017). Achieving this goal, also relies on and requires co-responsibility in terms of developing a safe and healthy research ecosystem, where all the agents show commitment with the public good and social development. This goes beyond short term policy fashions and towards an understanding of research as a formative, communicative, epistemically rigorous and ethically robust enterprise (Winch, Oancea, & Orchard, 2015).

At the school level, education policies must position school leaders as responsible for building organizational cultures that empower teachers to innovate and experiment, using research as a valid source of innovation and development (Brown, *et al*, 2017). Such cultures are best underpinned by collaborative inquiry processes as well as encourage distributed leadership that values each teacher's individual potential, and stimulates individual and collective reflection on teaching practices as fundamental steps towards creating a culture of trust and school development (Brown, 2020; Ahumada, *et al*, 2017). Such leadership values each teachers' potential and fosters teachers' agentic capacity and autonomy to make decisions adapted to pupils needs and class realities.

Universities, as research producers, clearly have their role. And researchers need to be encouraged to engage in practice-focused research and to promote research as an engine for school and social change (Ion & Castro, 2017). But schools and universities are not isolated institutions (Douglas, 1986) and cannot be successful without the support of policy makers, educational administrators, municipalities and other local/regional stakeholders involved at some level with educational reform (Guillen & Zeihner, 2018). Local, regional, national and international administrators and policymakers should be aware of the importance of the potential of research for the common good and social change. They must also both consistently promote and contribute to, as well as be equipped to productively join RIEP endeavours aimed at educational improvement. Promoting a collaborative approach: encouraging collaboration at different levels and shifting the rationality of school accountability away from one based solely on outcomes is a necessary pathway here. In England and Spain, as in many other contexts, RIEP is still far from being a part and parcel of the educational landscape. Change involves placing research and practice as part of the same discourse, introducing research as an instrument of both the political system and governance and creating stable conditions for research to fulfil a social function. We believe this is highly possible. It just takes the political will to do so.

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Plastics: a literature review in science education (2010–2019)

Plásticos: revisión bibliográfica en Didáctica de las Ciencias Experimentales (2010-2019)

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Abstract

Although plastics form part of everything that surrounds us due to their excellent properties, they also represent an environmental problem that requires an educational response. This paper presents an exploratory and descriptive study of the educational research published in this field, both nationally and internationally, over the past decade using the PRISMA declaration for systematic reviews. The analysis was performed using a selection of journals with confirmed quality indices in science education (six Spanish and four international). For each study, the authorship, nature (research or innovation), plastics-related content, educational level (infant, primary, secondary or university), methodology used (quantitative, qualitative or mixed) and teaching focus (propedeutic or competence-based) were analysed. The review shows that such studies are in the minority in the literature analysed, not exceeding 3.4% nationally or 2.3% internationally, with educational research accounting for the majority of studies. With regard to the content covered, the composition and properties of plastics

predominate, with studies related to environmental awareness or solutions to the problem, which are considered to be key, receiving relatively little attention. It is also seen that the authorship of non-university teachers is relatively low and that qualitative methodologies are used most often. Moreover, the transmission of content rather than competence-based teaching predominates. The above suggests that the problem of plastics remains a challenge in teaching.

Key words: plastics, literature review, educational research, educational innovation

Resumen

Los plásticos forman parte de todo lo que nos rodea por sus excelentes propiedades, pero también suponen un problema ambiental que demanda una respuesta educativa. Este trabajo presenta un estudio exploratorio y descriptivo sobre la investigación didáctica publicada sobre este tema en el contexto nacional e internacional en la última década empleando la declaración PRISMA para revisiones sistemáticas. El análisis se realizó en una selección de revistas con índices de calidad contrastados en Didáctica de las Ciencias Experimentales (seis españolas y cuatro internacionales). Para cada trabajo se analizó la autoría, su naturaleza como investigación o innovación, los contenidos tratados sobre plásticos, el nivel educativo (infantil, primaria, secundaria o universidad), la metodología empleada (cuantitativa, cualitativa o mixta) y el enfoque de enseñanza (propedéutico o competencial). La revisión muestra que estos trabajos son una minoría en el conjunto de la bibliografía analizada no superando el 3,4% en el ámbito nacional y el 2,3% en el internacional, acaparando investigaciones educativas el mayor número de trabajos. Respecto a los contenidos abordados predominan la composición y propiedades de los plásticos teniendo poca presencia trabajos relacionados con concienciación ambiental o soluciones al problema, considerados aspectos clave. Se observa también que la autoría de profesorado no universitario es relativamente baja y que la metodología cualitativa es la más usada. Asimismo, predomina la transmisión de contenidos, en lugar del desarrollo competencial. Todo ello sugiere que el problema de los plásticos sigue siendo un desafío para los docentes.

Palabras clave: plásticos, revisión bibliográfica, investigación educativa, innovación educativa

Introduction

The first synthetic plastic, namely Bakelite, was synthesised in the early 20th century. Since the 1960s, the ever-increasing demand of an

increasingly consumer-oriented society has resulted in a significant increase in plastics production worldwide, reaching a value of 322 million metric tonnes in 2015 (Lusher, Hollman and Mendoza, 2017). Indeed, plastics have helped to preserve health, improve transport, technological development or ecological performance, integrating themselves into our society, where they form part of almost everything around us and have gradually replaced other materials (Lusher et al., 2017). Their success resides in the fact that they are cheap, lightweight and exhibit high thermal and mechanical resistance (Elías, 2015).

However, this frenetic consumption has led to the large-scale generation of waste and its presence in our oceans (Jaén, Esteve and Banos, 2019), and this is the main problem of plastics: their sustainability as they are manufactured to be long-lasting. It is estimated that 8 million metric tonnes of plastics reach the oceans every year (Smith, Love, Rochman and Neff, 2018). Their main effects are physical, such as choking, asphyxia or injury to marine organisms (Eriksen, Maximenko and Thiel, 2013). Natural forces subsequently fragment them to form microplastics (Smith et al., 2018), which enter the food chain and are incorporated into marine biomass, including food destined for human consumption (Lusher et al., 2017). Moreover, as they are degraded, their additives, some of which are able to cross the walls of the intestinal tract, leach out (Smith et al., 2018).

During the World Ocean Summit in 2017, the United Nations Environment Programme (UNEP) proposed to eliminate microplastics and single-use plastics as the main sources of marine waste by 2022, and this was followed by the prohibition of single-use plastics in Europe in 2021 (Koch and Barber, 2019). Recently, environmental activist movements worldwide (Thunberg, 2019) forced the Climate Summit 2019 to reconsider measures for waste management, eliminate single-use plastics in countries outside the European Union (United Nations, 2019) or the 17 Sustainable Development Goals (SDGs) proposed by the United Nations (Gamboa, 2015).

Plastics contamination has become an environmental problem (Torres, 2019) that requires a response from all areas, including education. The aim of scientific education is to introduce social activism to students so that they become scientifically aware and socially responsible citizens who are able to make reasoned decisions as regards personal and civic science-related actions (Skamp, Boyes and Stanisstreet, 2013).

Several authors have demanded a response from schools. Thus, for Jaén et al. (2019), educators should play a role in raising citizens' awareness to allow them to face up to these problems, whereas Marcén and Molina (2016) consider that the change of citizens' attitudes and behaviours must come from the school. Jaén and Palop (2011) consider teaching to be a generator of worries and skills that must provide a response to these environmental problems, and should encourage students to form their own opinion and understand that their actions, however small, may affect their environment.

In conclusion, this is an urgent educational challenge to achieve a prepared and active population that is aware of, and takes measures against, this environmental problem. As such, we should ask ourselves whether the Science Education (SE) research published nationally and internationally is covering and contributing to resolving this problem. The following questions need to be asked:

- What proportion of research and innovation in SE over the past decade has covered the problem of plastics?
- To what extent do non-university science teachers participate in specialised SE publications covering this topic?
- Is there a frequent collaboration between specialist SE teachers and non-university science teachers in these studies?
- What plastics-related content is covered in these studies, and using what methodology and teaching focus?

Objectives

To answer the questions posed above, an exploratory and descriptive study of the current state of SE research in the field of plastics, published both nationally and internationally, was performed. The following objectives were established:

- To identify and describe the teaching research and innovation in the field of plastics published in the past decade in a selection of Spanish and international SE scientific journals.

- To analyse the influence of this research on the set of publications considered.
- To examine the degree of participation of non-university science teachers in those studies.
- To determine the proportion of articles published by university and non-university SE teachers, the contents covered and the methodologies used.
- To critically assess to what extent current national and international educational research is contributing to a response to this environmental problem.

Method

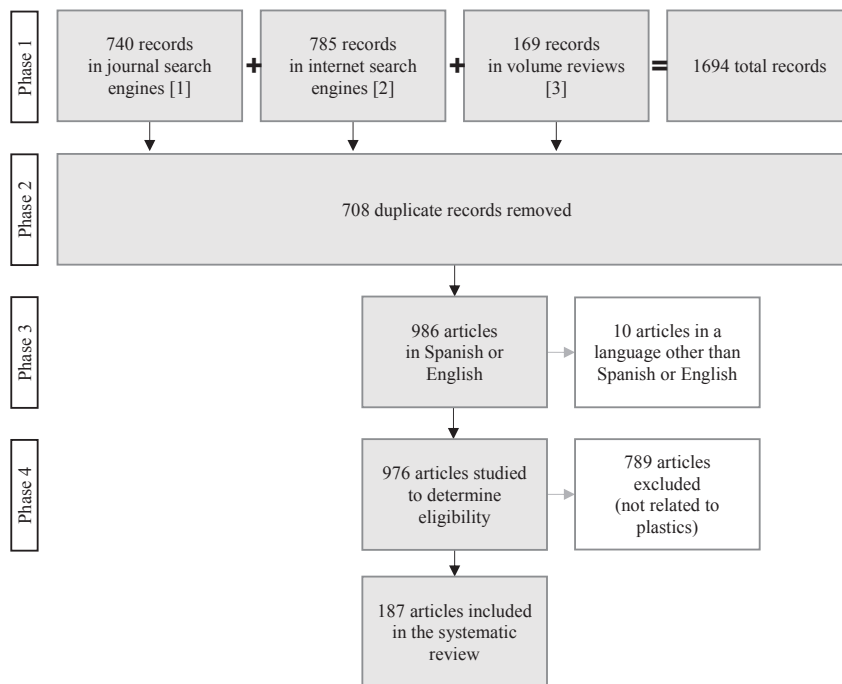
A literature review was performed using the journals listed in Table 1. The selection thereof was justified by the fact that they are all specialised SE journals. The selection criteria for the international journals was being in the first or second quartile of the JCR and SJR for several years of the decade studied. With regard to national SE journals, this criterion is very strict and none of them comply with it, therefore those journals that best reflect the state of the art in SE, with a marked influence in an Ibero-American context and which had been used in other reviews (Manchón and García-Carmona, 2018), were selected. Many of these national journals have the FECYT quality seal and are indexed in the JCR, SJR, ESCI WOS or Latindex.

TABLE I. Journals selected and scientific quality indicators (highest position in the decade)

Journal	JCR-SSCI Quartile (Impact Factor)	SJR	FECYT Quality Seal	Latindex Character- istics Met	IN- RECS- Educa- tion
National					
Enseñanza de las Ciencias (<i>EC</i>)	Q3 (1.183)	Q2 (0.52)	Yes	34	Q1
Revista Eureka sobre Enseñanza y Divulgación de las Ciencias (<i>REEDC</i>)	ESCI WOS	Q2 (0.48)	Yes	35	Q1
Revista Electrónica de Enseñanza de las Ciencias (<i>REEC</i>)	-	-	No	26	Q1
Alambique, Didáctica de las Ciencias Experimentales (<i>ALB</i>)	-	-	Yes	32	Q1
Investigación en la Escuela (<i>IE</i>)	-	-	No	30	Q1
Didáctica de las Ciencias Experimentales y Sociales (<i>DCES</i>)	ESCI WOS	-	No	32	Q1
International					
Science Education (<i>SE</i>)	Q1 (3.50)	Q1 (5.31)			
Chemistry Education Research and Practice (<i>CERP</i>)	Q1 (2.09)	Q1 (1.03)			
International Journal of Science Education (<i>IJSE</i>)	Q1 (1.51)	Q1 (1.94)			
Journal of Chemical Education (<i>JCE</i>)	Q2 (1.75)	Q2 (0.47)			

The review covered the period 2010 to 2019, both inclusive, which should give an overview of current SE research. The phases proposed in the PRISMA Declaration (Urrútica and Bonfill, 2010) for systematic literature reviews were followed (FIGURE I). Phase 1 involved the search for articles with *plásticos/plastics* in the title, abstract, key words or text of the manuscript. The journals' own search engines were used [1], and for those for which all results were not available or not shown, search engines such as Google Academic or university databases were used [2], always using boolean operators. To ensure that the search was complete, the electronic version of all publications were reviewed [3]. Duplicate publications were eliminated in phase 2, and articles in languages other than Spanish or English were discarded in phase 3. The suitability parameters for articles were decided in phase 4 based on the premise that they must be related to some aspect of plastics.

FIGURE I. Literature review according to the PRISMA Declaration (Urrútica and Bonfill, 2010)



The frequency of the articles selected was determined by journal and the percentage corresponding to the total number of studies published in that journal.

After reading the studies, the lead author of this study proposed a categorisation of each article based on the following:

- Authorship of the study. The number of authors, their educational level, contributions by each author and mix thereof were analysed.
- Nature of the study: They were categorised as educational research, educational innovation or other, based on the section of the journal in which they were published, and if this was not available, the characteristics of the study presented.

- **Topics covered:** The categories proposed in a previous study with secondary-school students (López-Fernández, González and Franco-Mariscal, 2021), which showed that they would like to learn about plastics, were used (Table II).

TABLE II. Categories for analysing plastics-related content

Category	Content
Composition and properties of plastics	Synthesis, manufacture, origin, degradation physicochemical properties of plastics.
Contamination of the environment by plastics	Environmental aspects due to contamination by plastics, final destination, consequences, biodiversity, etc.
Solution to the problem	Possible solutions, collection of plastics, recycling, etc.
Environmental awareness	Attempts to produce changes of attitude or behaviour with regard to plastics

- **Educational level.** The categories were infant, primary, secondary or university education, or not known.
- **Methodologies used.** As a large number of educational innovations did not follow the structure of a research project, for studies related to educational research the methodology (quantitative/qualitative/mixed), study type and instruments used were analysed.
- **Teaching focus.** The scientific teaching approaches were categorised as pedepedutic or competence-based.

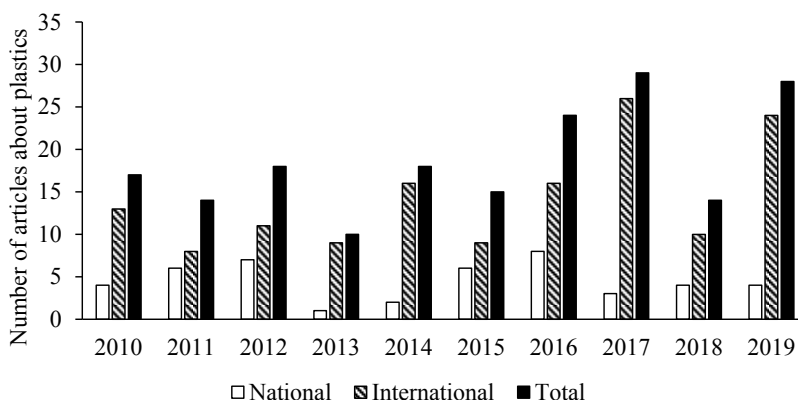
On the basis of that proposal, the other two authors performed their own assessment, indicating their agreement, doubts or disagreement. Studies for which there was no agreement were discussed until a consensus was reached.

Results

Plastics-related publications in the past decade

With regard to the plastics-related articles published between 2010 and 2019 (187), a clear difference was observed between those published nationally (45) and internationally (142). The distribution per year is shown in FIGURE II.

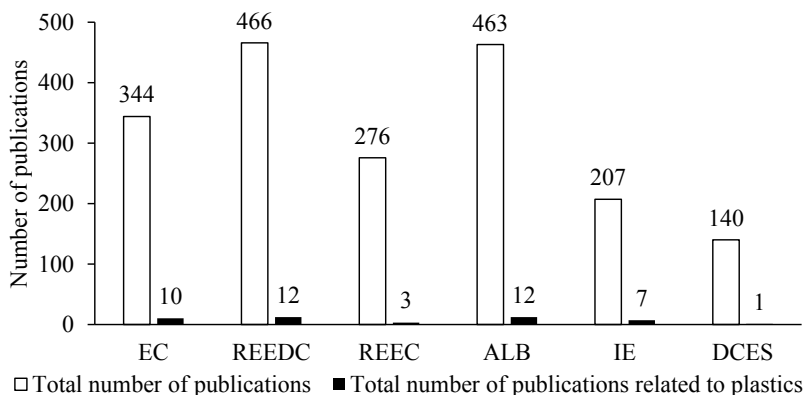
FIGURE II. Distribution of plastics-related publications by year (2010–2019)



No clear trend in the evolution of the number of articles published was observed in either context, with the largest number of articles being published internationally in 2017 and 2019 and nationally in 2016.

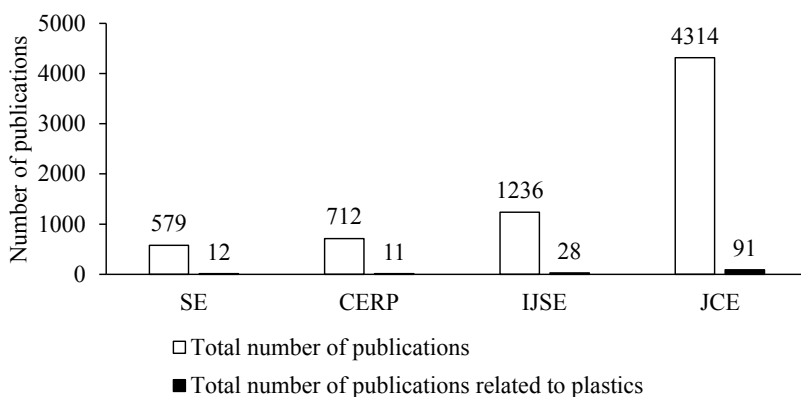
To determine whether this number was high or low, it was compared with the total number of articles published in each journal. The national study (FIGURE III) showed that *REEDC* and *ALB* published the most articles, with *DCES* publishing just one.

FIGURE III. Articles published in each national journal (2010–2019)



Internationally (FIGURE IV), almost all the journals selected published at least the minimum number of articles (12) found in Spanish journals. The highest number of plastics-related studies (91) were published in a chemical education journal (*JCE*), followed by *IJSE* (28).

FIGURE IV. Articles published in each international journal (2010–2019)



The percentage of articles reviewed with respect to the total (Table III) shows that, irrespective of their context, all journals analysed were in the range 0.7–3.4%.

TABLE III. Plastics-related publications with respect to all articles in the journal

Journal	Title	Frequency	Percentage
National (N=45)	EC	10	2.9
	REEDC	12	2.6
	REEC	3	1.1
	ALB	12	2.6
	IE	7	3.4
	DCES	1	0.7
International (N=142)	SE	12	2.1
	CERP	11	1.5
	IJSE	28	2.3
	JCE	91	2.1

The journals with the highest percentage of plastics-related articles published were *IE* nationally (3.4%) and *IJSE* internationally (2.3%). In addition, it is noteworthy that, with the exception of *REEC* and *DCES*, Spanish journals made a greater contribution to this field than their international counterparts over the period studied.

Authorship of publications

Table IV presents various authorship-related aspects.

TABLE IV. Characteristics of authors

		National Journals (N=45)		International Journals (N=142)		Total (N=187)	
		Frequency	%	Frequency	%	Frequency	%
Authors	One	11	24.4	25	17.6	36	19.3
	Two or three	30	66.7	62	43.7	92	49.2
	More than three	4	8.9	55	38.7	59	31.6
Educational level of teacher	Primary	3	3.0	2	0.4	5	0.8
	Secondary	21	20.8	23	4.7	44	7.4
	University SE	40	39.6	59	12.0	99	16.7
	University, other speciality	33	32.7	388	79.0	421	70.9
	Others (research centre, healthcare centre, foundation)	4	4.0	21	4.3	25	4.2
Contributions	One article	76	87.4	443	95.3	518	94.0
	Two or three	11	12.6	21	4.5	32	5.8
	More than three	0	0.0	1	0.2	1	0.2
Mix	One author*	11	24.4	26	18.3	37	19.8
	Same educational level	23	51.1	86	60.6	109	58.3
	Different educational level	11	24.4	30	21.1	41	21.9

*Mix not considered for articles submitted by a single author

Publications with two or three authors predominate both nationally and internationally (49.2%). Publications with a single author are less common in international journals (17.6%) but not in Spain (24.4%). Studies with more than three authors are more common internationally (38.7%).

The majority of authors are university lecturers (87.6%) and usually from areas unrelated to SE (70.9%), therefore the didactic treatment applied to the problem may differ from approaches in the SE field. Fortunately, the Spanish context is an exception as authorship is shared more evenly between SE university lecturers (39.6%) and those from other subjects (32.7%).

The participation of secondary school teachers is low (7.4%) even though their contributions are essential. However, a marked difference is seen between national (20.8%) and international journals (4.7%), thus highlighting the implication of Spanish secondary school teachers.

In addition, 94% of authors published just one paper, with those appearing on two or more publications being essentially non-existent. With regard to the mix of authors, the collaboration between authors from the same educational level, mostly university-based (58.3%), should be noted. A substantial collaboration between university lecturers and lower educational levels is not seen (21.9%).

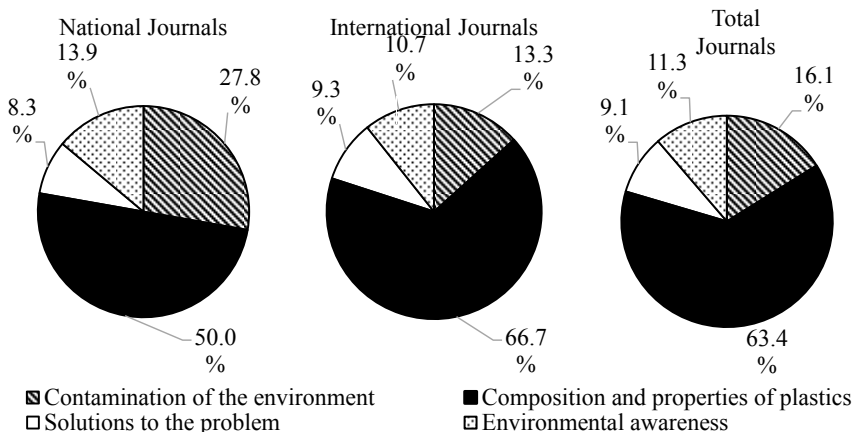
Nature of the studies

The nature of the studies is very similar both nationally and internationally. Thus, educational research accounts for the majority of studies (55.5% national and 54.2% international), followed by educational innovations (31.1% national and 32.4% international) and other studies (highlight, literature review or essays; 13.3% national and 13.4% international).

Content covered

FIGURE V shows the percentages for each category of content (Table 2) covered in the studies. The distribution of topics is similar both nationally and internationally, with the category *Composition and properties of plastics* clearly representing the largest number (63.4%). This category is somewhat more popular internationally (66.7%) than nationally (50%). The limited number of studies concerning *Environmental awareness* (10.7–13.9%) and *Solutions to the problem* (8.3–9.3%) should be noted.

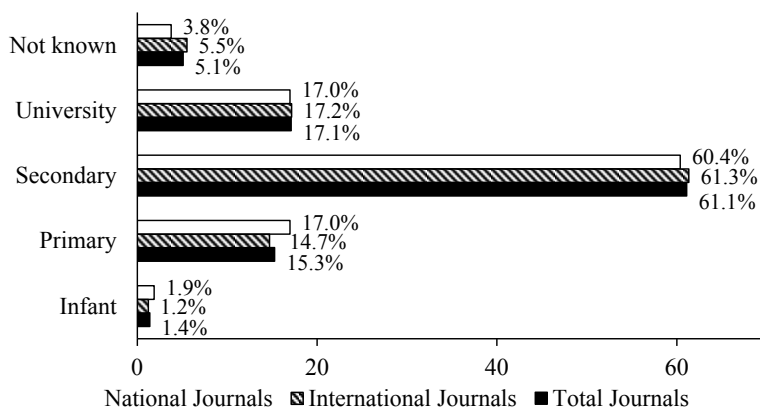
FIGURE V. Percentage of publications by content



Educational level

Our analysis showed that 61.1% of publications concern the secondary level, followed by university level (17.1%, FIGURE VI). Two types of study are found for the latter: teachers undergoing initial training (students taking a Degree in Primary Education Teaching or a Masters in Secondary Education Teaching), and those with professional futures in which plastics play an important role (students taking a Degree in Environmental Science, engineering degrees, etc.). The limited number of studies involving children aged less than 12 years is noteworthy.

FIGURE VI. Percentage of articles by educational level.



Methodologies used

The main type of research in national educational research studies is qualitative (60%), compared with quantitative (24%) or mixed (16%). In contrast, internationally, there is a better balance between the use of qualitative (39%), quantitative (31.2%) and mixed (29.8%) methodologies (FIGURES VII, VIII and IX).

The most common studies are descriptive (52.8%), followed by exploratory (25.9%), case studies (13%) and correlational (4.6%). Other minority studies are explanatory (2.8%) and interpretative (0.9%).

The most widely used instrument is any type of knowledge test (54%; open or closed questions, mixed, exams, etc.), of which 18.1% are pre-/post-test. Although tests are commonly used in combination with other instruments (71.2%), they were used alone in 23.8% of cases and combined with others in 33.3%. The second most widely used instrument is direct observation (20%), including daily observation (27.9% for this instrument), audio and/or video records (18%) or others. Interviews, productions by participants, portfolios, focal groups or educational curricula and text books are used in less than 11% of articles.

FIGURE VII. Methodology in qualitative studies.

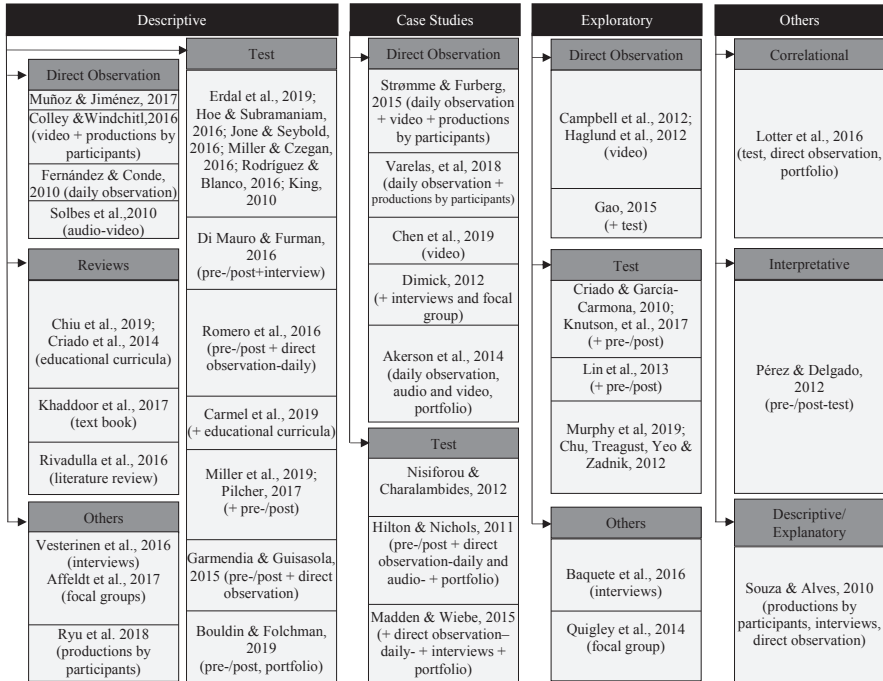


FIGURE VIII. Methodology in quantitative studies.

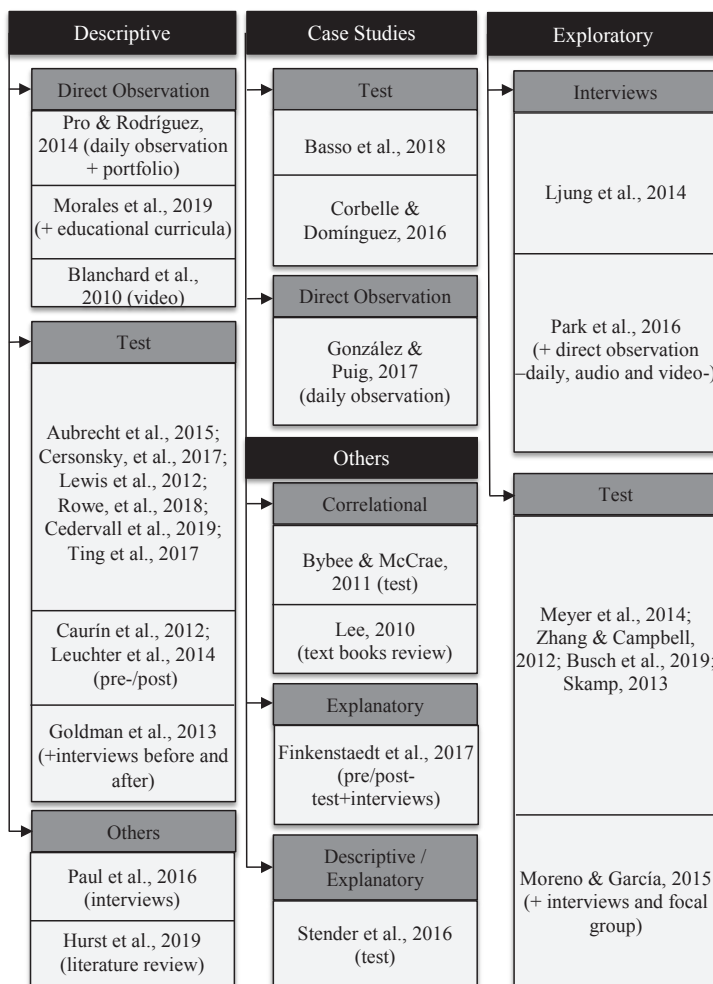
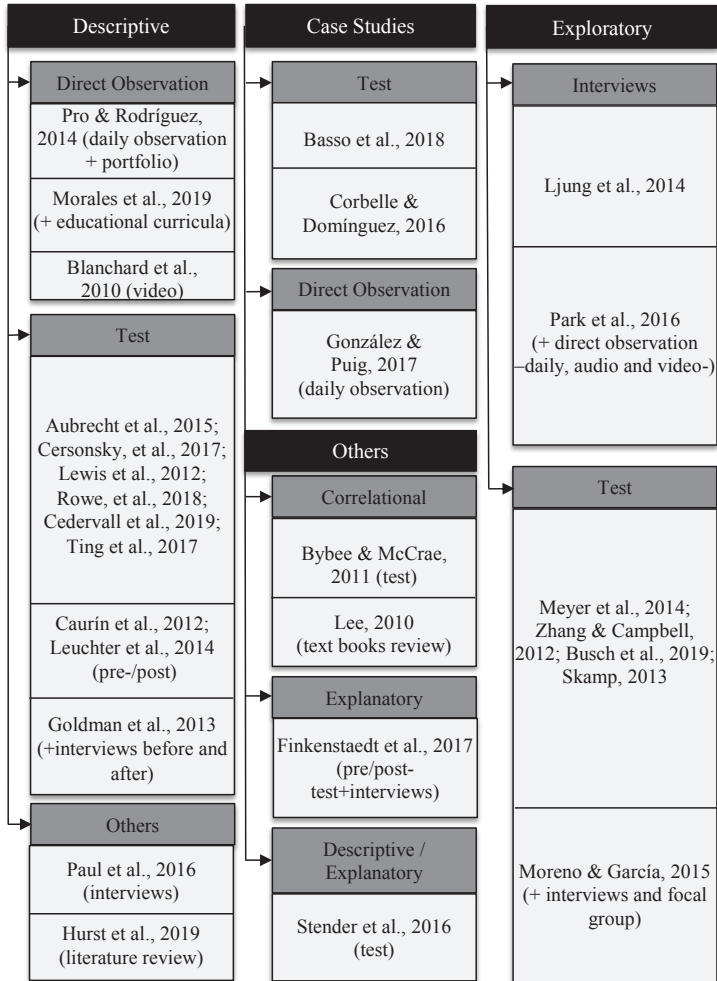


FIGURE IX. Methodology in mixed studies.



Teaching approaches

Two teaching approaches are detected. The main approach is propedeutic (64.7%), which is based on learning knowledge and scientific processes, without taking into account the interests of students and society (Furió et al., 2001), whereas the remaining 35.3% involve a competence-based approach involving the development of skills by application of knowledge.

Innovations are based on experiences that highlight learning of some properties of plastics (80.9%), with thermal or electrical conductivity being the most common. Another recurring topic concerns polymers, considered to be essential chemical compounds in plastics. Other, less-common proposals cover contamination by plastics and their environmental impact (6.3%).

Conclusions

Despite the importance of plastics and their contamination, the results found do not appear to suggest a school that generates environmental awareness and sensitivity, thus allowing citizens to give effective responses and resolve environmental problems, at least as regards the number of research studies published. Initial evidence for this is provided by the limited number of publications concerning plastics in SE in the past decade, with this number being somewhat higher nationally (3.4%) than internationally (2.3%). These values are in agreement with those from other reviews (Fernández, 2008), which highlighted the shortage of studies in environmental education or contamination. Another worrying aspect is the evolution of the number of publications over the past few years. Thus, whereas there appears to be an increase internationally due to activist actions (Koch and Barber, 2019), this is not seen in Spain.

The reason that 79.2% of studies are published by university lecturers is probably due to the fact that high-impact journals, such as those selected, tend to focus on studies in an academic setting. Similarly, effective collaboration between university-based researchers and those from other educational levels, such as secondary education, where a significant number of studies are performed, at least in Spain (18.8%), appears to be lacking. This type of collaboration between authors could

represent a major advantage as regards resolving the problem from a school viewpoint as these teachers are in direct contact with students and can see the effects of such studies, therefore they should be the ones who are involved in raising citizens' awareness (Jaén et al., 2019). The very limited number of studies in pre-secondary settings, which are essential to reinforce environmental education from an early age, should be noted (Corraliza and Collado, 2019).

The composition and properties of plastics are presented as the main contents, highlighting their importance in our lives, although there is a clear lack of practical studies regarding contamination, environmental awareness and the proposal of solutions. Indeed, studies regarding the direct relationship between plastics contamination and health are lacking (Cersonsky et al., 2017; Miller and Czegan, 2016), thus suggesting that this aspect of the problem is being essentially ignored even though increasing numbers of studies demonstrate the effects of plastics on our bodies (Smith et al., 2018).

The majority of contents are based on a propedeutic approach, which tends to be the main approach used in standard teaching practice by science teachers (Furió et al., 2001). This approach does not benefit from the contextualised and competence-based learning required for the development of scientific literacy (Pedrinaci et al., 2012). As noted by Corraliza and Collado (2019), dissemination of information and knowledge tends to be insufficient on its own, therefore the promotion of significant experiences is necessary. From our viewpoint, the teaching-learning of plastics should be oriented towards resolving a socio-scientific issue by way of scientific practices that allow all the perspectives, environmental repercussions and measures to be adopted to be understood. This will allow the development of critical thinking skills in students.

Similarly, improvements to some methodological aspects may contribute to progress in the teaching-learning of plastics. For instance, the use of quantitative and mixed methodologies, which are less widely used in Spain than internationally, and the use of more competence-based instruments, may help in that regard.

This study is not free from limitations. One of these is that an attempt has been made to limit the studies analysed to a national or international context, which is somewhat complicated given that many national journals also publish studies from overseas authors, many of whom are based in Ibero-America, and Spanish authors also publish in international journals.

Another important limitation is that the majority of proposals made in schools are never published, therefore supposing that the content of the studies published reflects what is actually happening in classrooms is risky, although it may give an initial insight into this topic.

Although the reality of educational research into plastics presents numerous aspects that can be improved, the question of contamination with plastics has begun to receive attention in the past few years, although the teaching of such topics remains a challenge for teaching staff. For the reasons presented above, we believe that it is essential to continue to study this aspect in research and educational centres at all levels.

Acknowledgments

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Study of academic plagiarism through multidimensional scaling and network analysis

Estudio del plagio académico mediante escalamiento multidimensional y análisis de redes

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Abstract

This article presents a study conducted through the application of analytical techniques of multidimensional scaling (MDS) and social network analysis (SNA) on the results obtained in a research on plagiarism in academic work. In it, the collection of data was done through the attribution questionnaire for the detection of coincidences in academic works called CUDECO, created and validated to evaluate the relevance that students give to the fact of quoting correctly and determine the causes that lead them to plagiarize. The objectives of the work that we present are three: to study the dimensional model of CUDECO; demonstrate the suitability of analysis triangulation to do so; build a graphic representation of the plagiarism model of the University of Vigo students that enables a general and comprehensive perception of it. The conceptual basis of the study is elaborated from the concepts of plagiarism and triangulation, more specifically analytical triangulation, and its possibilities in the Social Sciences. This permit us to make an introduction to the use of multivariate analytical techniques as an adequate means to validate a survey study. Within them, two applicable procedures are exposed that can be completed with the

analysis of social networks in the situation described (context). To respond to the objectives of the study, two multidimensional scaling procedures are applied: PROXimity SCALing (PROXSCAL) and Scaling by MAyorizing a COMplicated Function (SMACOF). Both procedures are completed with the Analysis of Social Networks (ARS). As the main conclusion, it is established that the suitability of the procedures used to carry out a study of the dimensionality underlying the responses to the items that make up a questionnaire has been demonstrated, in this case, the CUDECO and a better understanding of the causes of academic plagiarism.

Keywords: higher education; analytical triangulation; multidimensional scaling; academic plagiarism

Resumen

En este artículo se presenta un estudio realizado mediante la aplicación de técnicas analíticas multivariadas denominadas escalamiento multidimensional (EMD) y análisis de redes sociales (ARS) a los resultados de una investigación sobre comisión de plagio e integridad académica del alumnado de la Universidad de Vigo (UVigo). La información de partida ha sido recogida a través del Cuestionario para la Detección de Coincidencias en Trabajos Académicos (CUDECO), un instrumento creado y validado para evaluar, tanto la relevancia que el alumnado le da al hecho de citar correctamente, como las causas que lo llevan a cometer plagio. Los objetivos del trabajo son tres: estudiar el modelo dimensional del CUDECO, demostrar la idoneidad de la triangulación de análisis para hacerlo y construir una representación gráfica del modelo de plagio del alumnado de la UVigo que posibilite una percepción general y comprensiva del mismo. La base conceptual del estudio está elaborada a partir de los conceptos de plagio y triangulación, más concretamente de triangulación analítica, y a sus posibilidades en las Ciencias Sociales. Ello permite efectuar una introducción al uso de las técnicas analíticas multivariadas como medio adecuado para validar un estudio de encuesta. Dentro de ellas se exponen dos procedimientos aplicables que pueden completarse con el análisis de redes sociales en la situación que se describe (contexto). Para dar respuesta a los objetivos del estudio se aplican dos procedimientos de escalamiento multidimensional: PROXimity SCALing (PROXSCAL) y Scaling by MAyorizing a COMplicated Function (SMACOF). Se completan ambos procedimientos con el de Análisis de Redes Sociales (ARS). Como principal conclusión se establece que ha quedado demostrada la idoneidad de los procedimientos utilizados para realizar un estudio de la dimensionalidad subyacente a las respuestas de los ítems que componen un cuestionario, en este caso, el CUDECO y una mejor comprensión de las causas del plagio académico.

Palabras clave: educación superior; triangulación analítica; escalamiento multidimensional; plagio académico

Introduction

Plagiarism in academic papers

Plagiarism, like most topics of a pedagogical nature, constitutes a fact of great complexity and, consequently, its study requires the consideration and evaluation of multiple variables (Boillos, 2020; Cebrián-Robles et al., 2018). This is a recently topical phenomenon (Cebrián-Robles, Raposo-Rivas, & Sarmiento-Campos, 2016) in whose explanation it is necessary to take into account intrinsic/extrinsic factors that are in continuous interaction (Amiri, & Razmjoo, 2016; Sureda-Negre, Comas-Forgas, & Oliver-Trobat, 2015).

From a fundamentally hermeneutic approach to the phenomenon of academic honesty in the university, attention should be paid to those papers that, written mostly in the English language, focus on academic literacy and its relationship with plagiarism. In this regard, those of Abasi, & Graves (2008) can be cited, where university policies against plagiarism are criticized, since these can create a formal barrier, sometimes insurmountable, especially in the case of postgraduate students from other countries or centers that do not know the institutional culture of ensuring academic integrity, which generates negative discourses around plagiarism (Moxley, & Archer, 2019). Also of interest is the work of Badenhorst (2018) in which the difficulties presented to postgraduate students when facing academic papers such as the writing of a review are exposed, due to the lack of “a pedagogy that relates citation with the most complex and fluid conceptual and ontological practices that are implicit in academic contexts” (p.121). To an analogous conclusion, although referring to complex forms of plagiarism, come Childers, & Bruton (2016).

Two lines of interest can be identified in the Spanish language. On the one hand, those who emphasize the importance of the willfulness of plagiarism in the papers of university students as a characteristic feature; and, on the other, those who find in plagiarism a conscious behavior admitted by a large number of students. Within the first

group, Boillos (2020) proposes a taxonomy of unconscious plagiarism; Saneleuterio (2017) gives an account of those academic literacy activities in undergraduate students useful to avoid involuntary plagiarism; Vargas-Franco (2019), through a case study, affects the promotion of didactic aspects and gives less weight to punishers.

In the second group, Comas et al. (2011); Duche et al. (2020) found that a high percentage of university students who recognize dishonest academic behavior, although they disapprove it, consider that its use is widespread, known and to some extent accepted. This is a fact that is reinforced at present with the considerable increase in the portals of purchase of academic papers as necessary collaborators in the absolutely dishonest conduct of the current university students (Comas-Forgas, Morey-Lopez, & Sureda-Negre (2021). For our part, we have a certain knowledge of academic plagiarism through the research we have been carrying out over the last three years on its causes (Espiñeira-Bellón et al., 2021; Muñoz-Cantero et al., 2019; Muñoz-Cantero et al., 2021), but we are aware of the limitations of its results. We are interested in further deepening that knowledge. But ... how can we do it from the results we have been obtaining?

To answer this question, we have carried out the study that is reported in this article. In it, we try to take advantage of the possibilities offered by computer technology and the development of statistics to test a more complex model that, through multivariate analytical techniques, allows us to evaluate possible causal relationships underlying the results obtained so far. The results to which we refer come from the statistical analysis of the data corresponding to the application of a questionnaire to a sample of students at the university (see for this purpose the section Methodology).

Triangulation as a starting concept

When we consult the entry of the term “triangulation” in the Diccionario de la Real Academia Española (RAE), in its 23rd edition, we find a recursive definition of double nature. It is an operation and, at the same time, it is the set of data obtained by that operation or action. It was born in the disciplines of Architecture and Geology, related to the fact of measuring and whose constituent element is the triangle as a paradigm of simplicity,

completeness and security in the results. Also, the term triangulation is used in navigation to locate a position with reference to several points. Its essence is present in the correctness of the measures and in the relationship between those that are known to us. The translation of this concept from the fields of Architecture and Geology, as well as that of the Navy, to scientific research takes place thanks to a process of analogy that finds practical, utilitarian and even ontological similarities.

Triangulation in educational research can be said to generally consist of “the application and combination of several research methodologies in the study of the same phenomenon” (Denzin, 1989, p. 297). This aims to improve both the validity and reliability of the data obtained in the process and of the process itself, and it is here that the dual nature and recursiveness of triangulation are really highlighted. The idea behind triangulation in scientific research is that the convergence of multiple constituent elements of the research process makes it possible to support the conclusion on a stronger basis than can be provided by support in only one of them. If a hypothesis is contrasted from different approaches and is not refuted, it has a greater degree of validity than if it only resists the contrast of one of the approaches.

There are several works that focus on the vicissitudes of triangulation that can be consulted (Arias, 2000; Denzin, 1970; Denzin, 1989; Rodríguez, Pozo, & Gutiérrez, 2006; Thurmond, 2001). All of them contemplate the basic types of triangulation proposed by Denzin (1970) and that would derive from the combination of two or more data sources, researchers, methods and theories. Years later, Kimchi, Polivka, & Stevenson (1991) also consider triangulation in the analysis instrument sector, which would be called analytical triangulation or triangulation in the analysis that, for Rodríguez, Pozo, & Gutiérrez (2006) is a technique of confrontation and a tool for comparing different types of data analysis that, with the same objective, can contribute to validate a survey study and enhance the conclusions derived from it. In a subsequent methodological review of triangulation as a strategic research technique Alzás et al. (2016) consider that when the different methods or instruments of analysis pursue the same objective, as it is the case of this research, we would be facing a genuine process of triangulation, beyond the mere combination or complementation of techniques.

In this sense a very interesting work is the one published by Bright, Heesen, & Zucker (2016) in which they develop a logical-formal model

that concludes with the fact that triangulation provides confirmatory support for its use in improving the reliability of research results and, in particular, it does so even if the researcher is not sure which of the available methods or techniques can be trusted.

Multidimensional scaling

It is necessary to add to the possibilities that, as we have seen, the triangulation of analysis brings to educational research, the capacity, power and versatility of computers and programs that allow to successfully face the simultaneous processing of large amounts of data. In fact, several multivariate analytical techniques emerged from theoretical studies (Bennett, & Hays, 1960; Kruskal, 1964a; Kruskal, 1964b; Shepard, 1962; Torgerson, 1958) have had to wait in time until computer technology facilitated their recovery and promoted their use among the research community. MultiDimensional Scaling (MDS) is one of these multivariate analytical techniques. It can be conceptualized as a procedure that allows the person investigating to determine the representation they perceive with respect to a set of objects or variables (companies, products, ideas or other elements associated with common perceptions), as well as to submit it to judgment (Aldas, & Uriel, 2017; Pituch, & Stevens, 2016). Here the word object has a polysemic nature and refers to any entity that we wish to submit to analysis (Arce, De Francisco, & Arce, 2010).

The purpose of the MDS technique is to transform similarity judgments and general preferences by trade marks or opinions into distances represented in a multidimensional space (Hair et al. 2014; Johnson, & Wichern, 2019). The degree of adjustment between the original data and calculated distances is translated into a numerical indicator called “stress.” The closer you get to zero, the better the adjustment. Specific papers such as Real (2001), Guerrero, & Ramírez (2002) or Hahs-Vaughn (2017) can be consulted in order to explore this type of technique.

Social Media analysis

In this study, the Social Media Analysis (SMA) complements the multivariate analytic technique MDS. The SMA is another technique used

to handle and make comprehensible large volumes of information and visualize very complex structures in a simple way. Structures (nodes) and relationships (arcs) can be studied with it. It is based on the theory of graphs (Gaete, & Vasquéz, 2008; Paniagua, 2013) and as a methodological option, is focused on the study of structures composed of elements called actors or nodes and the relationships that occur between them (Sarmiento, Ocampo, & Cid, 2020).

In the analysis of social media, the structure of the relationships in which each node is involved is considered, these nodes are described through their connections (Pavlopoulos et al., 2017).

The application of network theory in the social sciences has had an important boom in recent decades due to its flexibility to analyze relationships and underlying interdependencies in data sets (Sandoval, Morales, & Díaz, 2019).

A network is a set of points that are joined by links (lines or edges) from an association rule that indicates how nodes are related (Mitchell, 2009).

Objectives

In view of the possibilities offered by the technique of analytical triangulation through multidimensional scaling (PROXCAL and SMACOF) and social media analysis (SMA), the following objectives are set out as objectives of the study:

1. To make explicit, to make visible and to study the dimensional model of the Questionnaire for the Detection of Matches in Academic Jobs (CUDECO), based on the analysis of the responses of the students to the 47 items on it.
2. To demonstrate the suitability of the triangulation of analysis in the study of the dimensionality underlying the responses to the items that make up the CUDECO questionnaire, while showing its possible usefulness for other similar papers.
3. To construct a graphical representation of the student plagiarism model of the University of Vigo based on their responses to the items of CUDECO that allows a general and comprehensive perception of the model that the student possesses about academic plagiarism.

Methodology

Context of the study

The present study is part of the project “Study on plagiarism in students of the Galician University System”, developed in academic courses 2018/2019 and 2019/2020. In this study, the Questionnaire for the Detection of Matches in Academic Jobs (CUDECO) (Muñoz-Cantero et al., 2019) was applied to more than 10.000 students of the Galician University System. Of these, 2,664 from the University of Vigo responded to the survey.

Sample

The students surveyed are: 2,383 undergraduate students and 281 graduate students. 1,625 declare to belong to the masculine gender: 1,625; to the female: 1,026; don't know/no reply: 13. Their average age is 21.31 years and the ages range from 17 to 73 years.

They belong to the different branches of knowledge, whose centers and degrees are distributed throughout the 3 campuses of the university, being their distribution the following: Art and Humanities: 402; Engineering and Architecture: 449; Science: 297; Health Sciences: 252; Social and Legal Sciences: 1.021.

Instrument

CUDECO (see annex) is set up by a total of 59 questions, 9 referring to subject identification variables and 47 Likert-type scale items grouped into five dimensions as follows:

- I) 12 items on the importance of teachers, examples: He gives me precise instructions how to prepare the paper; It gives me the basic rules to cite properly.
- II) 8 items on the usefulness of properly quoting, examples: It serves to refer to the original sources; It serves to recognize the merit of the original authors.

- III) 7 items on plagiarism in the different courses of the career, examples: I have delivered some paper done by someone else in a previous course; I have copied excerpts from printed sources and, without citing them, I have incorporated them into my written work.
- IV) 11 items on the causes that produce it, examples: My colleagues do it; access to online material is easy and convenient.
- V) 9 items on plagiarism in academic papers of their classmates, examples: They have copied excerpts of the papers they have submitted in previous courses as a new one; They have submitted a complete paper downloaded from the Internet, without modifying it, as produced on their own.

Procedure

In order to achieve the proposed objectives, the results obtained at the time were taken through the statistical analysis of the data corresponding to the answers provided by the students of the University of Vigo to the 47 items of the CUDECO and, with them, a matrix of 125,208 units of information was generated (2,664 students multiplied by 47 items answered by each of them). In other words, they reduce complexity without undermining the underlying information.

Statistical analysis techniques

To manage and understand so much information, it is necessary to use multivariate techniques, completing them with social network analysis. As stated above, they constitute valid procedures for reducing the number of information units while maintaining the existing information load. In other words, they allow complexity to be reduced without undermining the underlying information.

The following are the three procedures used in this work:

- PROXimity SCALing (PROXSCAL), used as an MDS with metric data, implemented in IBM SPSS 25. PROXSCAL maximizes the

determination of the input environment and the beginning of the algorithm.

- Scaling by MAyorizing a COmplicated Function (SMACOF), such as MDS with ordinal data, which is available as a package in R1. SMACOF follows the iterative processes of procedures such as Alternating Least Squares Scaling (ALSCAL), although improving its algorithm to minimize stress (López-González and Hidalgo, 2010).
- Social Media Analysis (SMA), a technique that allows to manage and make large volumes of information understandable. In this work we will focus on the visualization of the structures that result from the analysis of the data and for this the Gephi program will be used (Bastian, Heymann, & Jacomy, 2009)². It is an open source software for the analysis of graphs and networks that provides easy access to network data, as well as to spatialize, visualize, filter and cluster.

Results

Multidimensional scaling

PROXCAL and SMACOF output data are observed in Tables I and II. In both cases, the data shows that the two-dimensional model obtained has a good fit.

Thus, in Table I, a stress index of .01767 is the first indicator of this, since the higher the adjustment is worse. Similarly, values close to one, both in the dispersion explained (D.A.F.) and in the Tucker congruency coefficient, are also indicators of good adjustment (Arce, de Francisco, and Arce, 2010, pp. 47-48). Thus, a good fit of the model obtained to the distances derived from the coordinate matrix is observed (Real, 2001, p. 26).

¹ Through the link <https://www.r-project.org/>

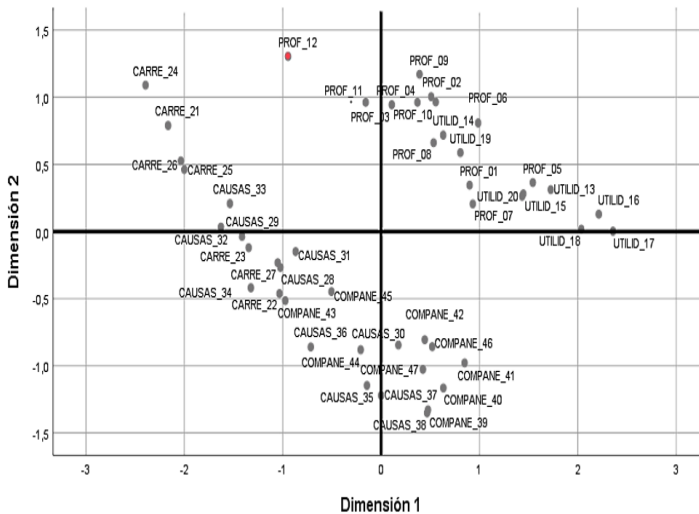
² Accessible in <https://gephi.org/>

TABLE I. Stress measurements and data adjustment using PROXSCAL

Normalized gross stress	.01421
Stress-I	.11919
Stress-II	.26719
S-Stress	.01767
Explained dispersion (D.A.F.)	.98579
Tucker congruence coefficient	.99287

Next, Graphic I, originated as a result of running the PROXSCAL procedure, shows the two-dimensional map of the responses given to the CUDECO items, which takes the values of the two dimensions as coordinates. The coordinate axes have been marked to make the quadrants visible when interpreting the results. Thus, by being able to visualize information and interactions between variables, possibilities are opened for the observer, through his cognitive-perceptive and even intuitive capacity, to perform an exploration and understanding of many units of information at the same time.

GRAPHIC I. Graphical representation of dimensions generated by PROXSCAL



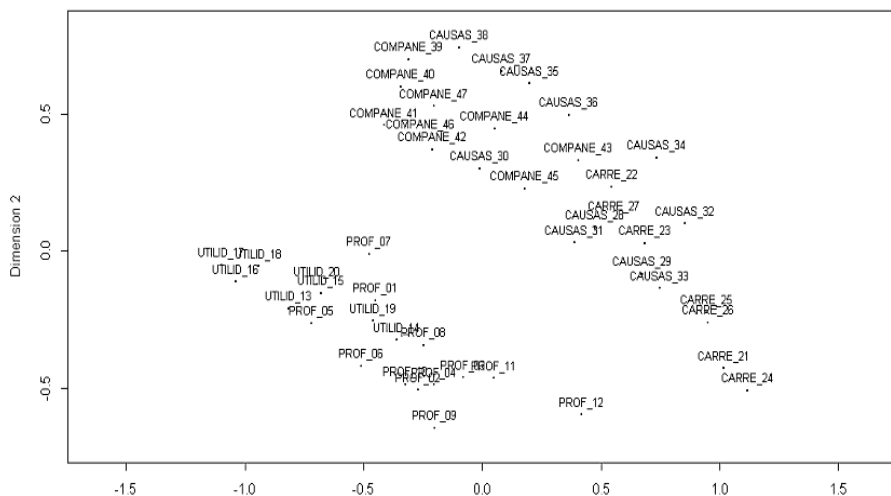
As in Table I, Table II shows that the Stress value is close to 0 and the number of interactions is 29, which also indicates that it is a well-adjusted two-dimensional model.

TABLE II. Output information of the SMACOF procedure

Call: mds(delta = dis, type = "ordinal")	Model: Symmetric SMACOF
Number of objects:	47
Stress-I value:	.118
Number of iterations:	29

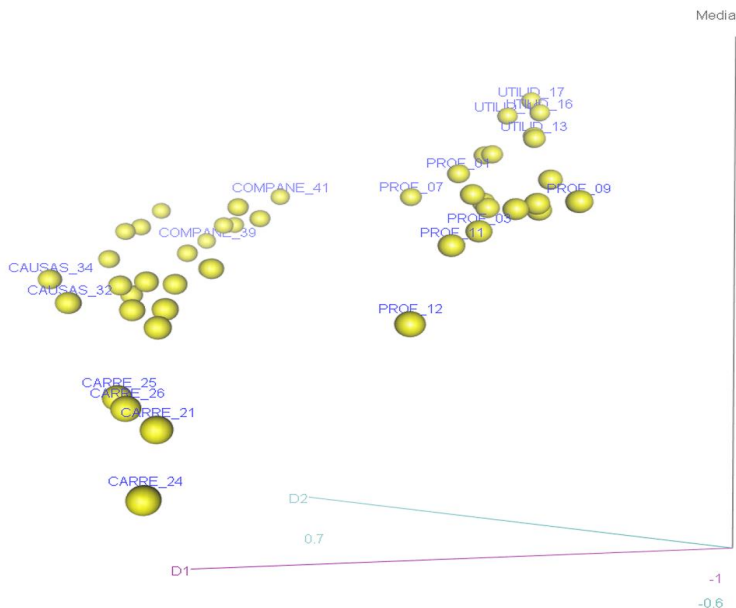
When the SMACOF procedure is executed with the data and a two-dimensional output is requested, the resulting graph obtained is similar to that produced by PROXSCAL (Graphic II).

GRAPHIC II. Graphical representation of dimensions generated by PROXSCAL



If the average value is added as a new coordinate to the SMACOF results, a three-dimensional representation of the results is obtained (see Graphic III).

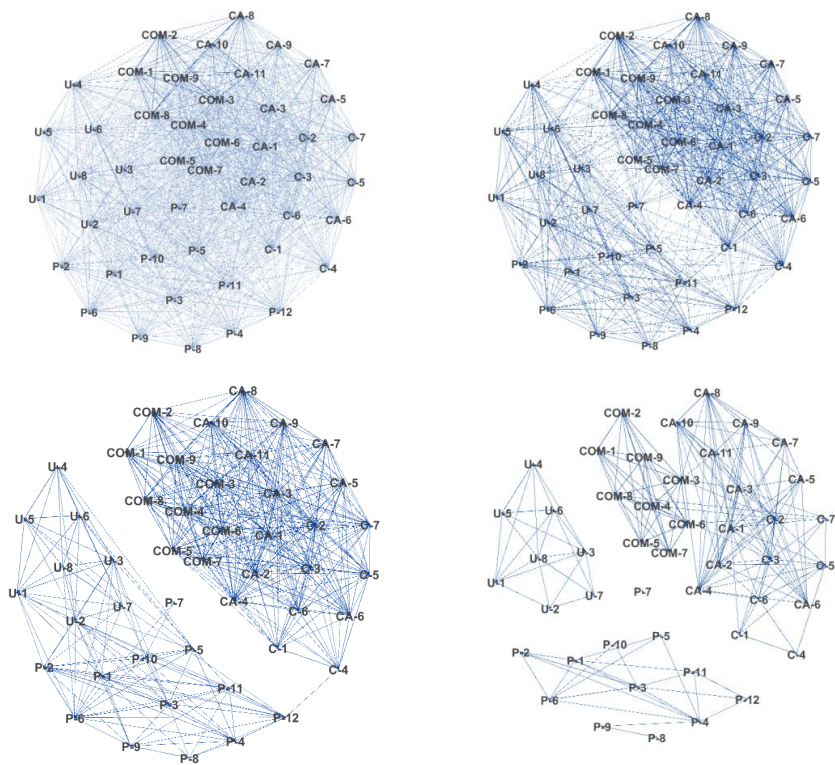
GRAPHIC III. Tridimensional representation



Social Media Analysis (SMA) Social Media Analysis (SMA) requires a set of nodes, in this case the 47 items that make up CUDECO and the relationship between them, using the correlation indexes between those items.

In Graphic IV it can be seen how the intensity of the relationships define groups, the same observed in the MDS results. The first graph shows all relationships, the second only those with correlations $r > .15$, the third $r > .2$ and the last one $r > .3$.

GRAPHIC IV. Data visualization according to the intensity of your relationships



Discussion of results

Although the discussion of results is difficult to be carried out due to the scarce existing research on plagiarism with methodology such as that used in our work, it can be said that works such as those of Soto-Ardila et al. (2019) and Soto-Ardila et al. (2020) are good indicators that we are facing very suitable methodologies to visualize underlying relationships that provide a greater understanding of facts investigated using statistical analysis methodologies.

However, the fact that groups of students who intentionally copy may be identified, as opposed to others whose actions relate more to ignorance and/or lack of information, pointing to the need for teacher assistance to overcome these dishonest behaviors, places us close to the results obtained by Abasi, & Graves (2008); Boillos (2020); Muñoz-Cantero et al. (2021); Saneleuterium (2017).

Conclusions

In view of the results obtained, the following can be concluded:

1st. In relation to objective 1, it can be said that the in-depth study of graphic representations improves the knowledge of the model and allows us to visualize and confirm relationships unknown until now:

- If we start from a panoramic view (Graphic 3) and we approach to identify groups we find the following:
 - The general vision shows us an arrangement of the variables in the form of V.
 - The average values of the variables are lower the closer they are to the axis.
 - From the axis (career-variable 24), each variable is arranged according to its value in each of the dimensions.
 - The distribution of values in one of the dimensions is uniform and continuous (teaching staff-variable 12 to usefulness-variable 17), while in the other dimension there is a jump in the values, which is greater when the average of the variables is higher, which generates the aforementioned arrangement in V (from career-variable 24, to peer-variable 41; from career-variable 24, to causes-variable 34).
 - Those items belonging to the utility and teachers factors are placed to one side; while causes and companions are placed to the other side. Those related to the career factor and, to a lesser extent, with causes and teachers are grouped at the axis.
- As we zoom in and get closer, we discover several groupings of variables (Table III) that, starting at the bottom (see Graphic V), would be the following:

- In the first grouping, with the values of the lowest average, those belonging to the career factor that refer to the whole or total copy would appear and, beside them, but alone, we find the item that refers to the lack of coordination of teachers.
- As part of the y axis of the chart, the copy of fragments from printed sources, associated with causes related to ignorance, slight sanctions or social apology (the others also do so), would be placed.
- In the same y axis, but with higher average values, the group of copies of fragments from the web and the notes of the faculty are found, associated with possibility causes.
- Moving to the x axis, but with similar averages, we observe a group that defines a facilitator teacher, who follows the work and provides personalized attention in the classroom, the papers that he requests are creative, adapts the time to the workload and uses anti-plagiarism tools.
- With higher average values, in the same x axis, a group that defines utility as a necessary requirement and scientific nuance in addition to allowing the demonstration of generating new information appears. In this group the teachers who pay individualized attention in tutorials is also present.
- Following, and with the highest average values, a group appears with items solely belonging to the utility factor, which refer to recognizing the merit of authors, referring to the original sources and allowing to support the arguments themselves.
- Finally, the group with higher values of the y axis groups the actions of partial copying by the colleagues. This includes the delivery of papers written by some colleagues from previous years, associated with causes related to work overload, lack of time, ease of doing so and convenience of internet access.

GRAPHIC V. Concepts resulting from groupings of CUDECO items

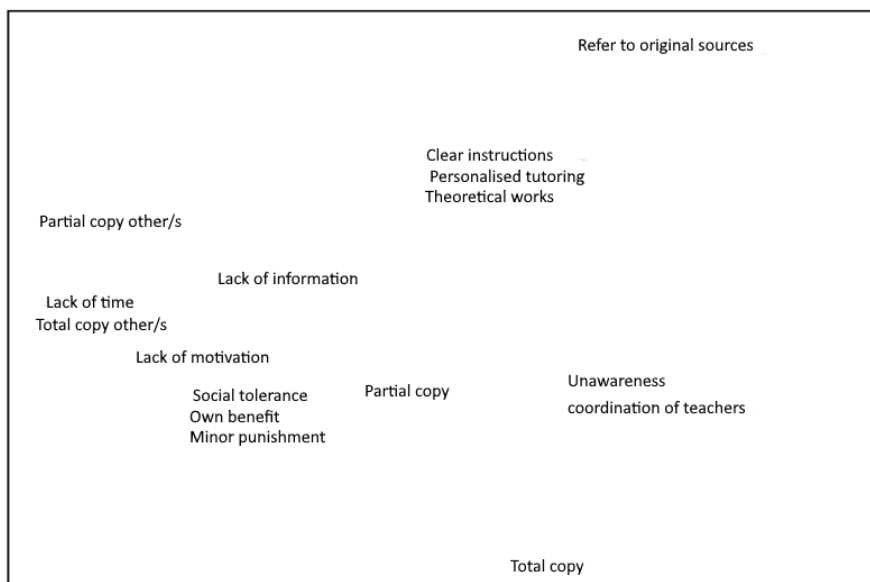


TABLE III. Groupings of variables into more general concepts

Full copy	Career-24	I submitted as my own some complete paper downloaded from the Internet, without modifying it
	Career -21	I submitted a paper written by someone else in a previous course
	Career -26	I did some work entirely from printed sources, without citing the authors
	Career -25	I did some work entirely from fragments literally copied from web pages

Minor sanctions Social tolerance Partial copy Self-leverage	Career -33	Penalties are not serious
	Causes-29	My classmates do it
	Career-23	I copied excerpts from printed sources (books, newspapers, magazine articles, etc.) and, without citing them, incorporated them into the paper I had written.
	Causes-31	It gives me the chance of getting better academic results
	Causes-28	It is a "shortcut" that is generally accepted
	Career-27	I used excerpts from my teachers' notes to elaborate some paper, without mentioning them
	Career-22	I copied fragments of texts from web pages and, without citing the sources, I incorporated them into the paper I had written.
Copy all other/s Lack of information Ignorance Lack of time Lack of motivation	Colleagues-43	They submitted a complete paper downloaded from the Internet, without modifying it, as their own
	Colleagues-45	They did entirely a job from printed sources
	Causes-34	I was unaware that citing sources is mandatory.
	Causes-30	Access to online material is easy and convenient
	Causes-35	Lack of precise instructions on how to write a paper
	Causes-36	Lack of motivation
	Causes-37	Lack of time
Partial copy other/s	Colleagues -39	They submitted some paper written by someone else in a previous course
	Colleagues -40	They copied excerpts from papers submitted in previous courses as a new one
	Colleagues -41	They copied excerpts of texts from web pages and, without citing the sources, incorporated them into the paper they had written.
	Colleagues -42	They copied excerpts from printed sources (books, newspapers, magazine articles, etc.) and incorporated them into the paper they had written without citing the sources.
	Colleagues -44	They submitted a paper composed solely of literal excerpts extracted from online sources.
	Colleagues -46	They used excerpts from their teacher's notes to write a paper, without citing them
	Colleagues -47	They admit as appropriate the "cut and paste" method when submitting a paper
Teaching staff coordination	Teaching staff-12	He coordinates with other teachers to avoid saturating students with work

Ignorance	Causes-32	I was unaware of regulations at my university penalizing this practice
Teaching staff usefulness	Teaching staff-9	He requests creative/innovative paper
	Teaching staff-11	He adapts the workload to the time available for each subject
	Teaching staff-4	He offers individualized attention in the classroom during the preparation of the paper
	Teaching staff -2	He provides me with the basic rules to cite properly
	Teaching staff -6	He evaluates the correct citing of the incorporated documentary sources
	Teaching staff -8	He requires essentially practical papers
	Usefulness-14	It serves to demonstrate that I learned properly
	Usefulness -19	It is used to generate discussions or debates from the mentioned one
	Teaching staff -1	He provides me with precise instructions to prepare the paper
	Usefulness -13	It serves as a necessary requirement in the realization of academic papers
	Usefulness -15	It serves to give a scientific nuance to my paper
	Usefulness -20	It serves to demonstrate that I can generate new information or ideas from the cited one
Theoretical papers Refer to original sources	Teaching staff -7	He requires essentially theoretical papers
	Usefulness -16	It serves to recognize the merit of the original authors
	Usefulness -18	It supports my arguments

2nd. If we take into account objective 2 and the achievements obtained in this regard, it can be said that the suitability of the triangulation of analysis has been demonstrated in the study of the dimensionality underlying the responses of the items that make up the CUDECO questionnaire. Undoubtedly a fact indicative of the importance and usefulness of this test to achieve a better knowledge of the underlying dimensions that may exist in a psycho-pedagogical or socio-pedagogical event.

3rd. With respect to objective 3, it has been possible to construct a graphic representation of the plagiarism model of the students of the University of Vigo from their responses to the CUDECO items, which allows a greater understanding of it, suggesting new hypotheses and the corresponding analyses.

As a summary, when interpreting the reality of the phenomenon of plagiarism in university students of UVigo through CUDECO, two different meta-dimensions are identified, in their spatial representation, that group the five dimensions included in the questionnaire.

The first, with high values, combines the usefulness of citation with the actions of teachers to avoid plagiarism behavior. This places us facing the importance of teaching actions in the classroom and office hours to avoid student plagiarism, and even to correct them immediately if they occur.

In this regard, it is possible to propose, in the form of hypotheses, didactic actions that, probably pointing to the usefulness that it has for any student to know how to quote, try to clarify the reasons that exist to do it well, at the same time that they take advantage of the opportunities provided by the teaching-learning process of a subject (from the presentation of the teaching guides to the evaluation by competences). This entails doing so on the basis of the teachers' example and the tutelage of the students in the classroom work, including the use of tools (Turnitin, 2021). The design, implementation and evaluation of organizational measures for teacher coordination and facilities for the management of regulations and guidelines for classroom papers, end of grade or end of master's degree papers, which are normally available in faculties, schools and university library services are required. The handling of some papers as examples and sources of critical comments will also be useful.

The second meta-dimension includes the plagiarism actions carried out by the students throughout their careers, with the lowest values, which contrasts, with high values, with those carried out by their classmates. And in the midst of the actions of plagiarism the causes that lead to its realization appear. This relationship places us before a type of student who interprets plagiarism as a socially tolerated fact and that in university centers, if discovered, is hardly penalized. Today, with the Internet, total and partial copies can be made according to the objective without this being described as unethical, because what is on the netpaper is public. It is something that, especially if it is partial copy, most of the colleagues do, because they need, like them, to get the papers and the subjects forward. In addition, what is on the Internet, being public, copying it and pasting it cannot be considered unethical. The justifications that are based on the lack of coordination of the teachers and the limited time

available to the students, two usual attempts of justification, can probably be added to this.

In view of this position, as a complementary proposal to the previous one, and in view of the revised bibliography, in addition to the basic explanations of what intellectual property law means, it is appropriate to use the university's anti-plagiarism tools, as well as existing regulations and rules which include punishment for the taking over of others' intellectual property for the sake of their own benefit. This will require working with the students, in each subject and in the corresponding office hours devoted to the papers to be carried out, on the meaning of the detected coincidences and the need to mention and refer to the authorship of the material. Some considerations about the integrity of individuals as one of the values that must characterize university life are likely to be required. On the other hand, the poor coordination of teachers due most of the time to causes beyond their control, must require the attention of the decanal and rectoral teams.

Limitations and Prospects

The limitations of this research study can be found in the superficial treatment that has been given to the data, without having delved deeper in the social media analysis (SMA). Hence, in these work the SMA is presented as a supplementary technique of multidimensional scaling (MDS). On the other hand, the fact that the sample is limited to the University of Vigo only and despite its sufficiency and representativeness in the branches of knowledge, could include some bias related to aspects of the aforementioned university.

As for future work that should be done taking into account the intuitions derived from the information represented in the Graphs, it can be said that we are open to the approach of new hypotheses whose verification may require moving from intuitions to analytical processes. In particular, aspects such as the existence of two meta-dimensions isolating in groups, three and two respectively, the initial dimensions of the measuring instrument are indicating that it is probably appropriate to carry out a review of some aspects of the CUDECO, such as the inclusion of a new dimension or dimensions covering the space between the two discovered meta-dimensions. Likewise, in subsequent researches, it would

be necessary to respond to the limitations set out above with a sample of the entire university population of the three universities of the Galician University System and, to the same extent, to deepen the analysis of the data collected, either with MDS or SMA or any other analytical technique that can be used.

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Anexo

CUDECO variables grouped by dimensions

The teachers...

1. He provides me with precise instructions to prepare the paper
2. He provides me with the basic rules to cite properly
3. Track the evolution of the work taking into account the citation of sources
4. He offers individualized attention in the classroom during the preparation of the paper
5. Offers individualized attention in tutorials during the preparation of the work
6. He evaluates the correct citing of the incorporated documentary sources
7. He requires essentially theoretical papers
8. He requires essentially practical papers
9. He requests creative/innovative paper
10. Handles detection tools for copied fragments in jobs
11. He adapts the workload to the time available for each subject
12. He coordinates with other teachers to avoid saturating students with work

How useful is it for you to quote?

1. It serves as a necessary requirement in the realization of academic papers
2. It serves to demonstrate that I learned properly
3. It serves to give a scientific nuance to my paper
4. It serves to recognize the merit of the original authors
5. It serves to refer to the original sources
6. It supports my arguments
7. It is used to generate discussions or debates from the mentioned one
8. It serves to demonstrate that I can generate new information or ideas from the cited one

Throughout the race career..

1. I submitted a paper written by someone else in a previous course
2. I copied fragments of texts from web pages and, without citing the sources, I incorporated them into the paper I had written
3. I copied excerpts from printed sources (books, newspapers, magazine articles, etc.) and, without citing them, incorporated them into the paper I had written
4. I submitted as my own some complete paper downloaded from the Internet, without modifying it
5. I did some work entirely from fragments literally copied from web pages
6. I did some work entirely from printed sources, without citing the authors
7. I used excerpts from my teachers' notes to elaborate some paper, without mentioning them

Causes that have motivated you to carry out the previous actions

1. It is a "shortcut" that is generally accepted
2. My classmates do it
3. Access to online material is easy and convenient
4. It gives me the chance of getting better academic results
5. I was unaware of regulations at my university penalizing this practice
6. Penalties are not serious
7. I was unaware that citing sources is mandatory
8. Lack of precise instructions on how to write a paper
9. Lack of motivation
10. Lack of time
11. Work overload

I think my colleagues...

1. They submitted some paper written by someone else in a previous course
2. They copied excerpts from papers submitted in previous courses as a new one
3. They copied excerpts of texts from web pages and, without citing the sources, incorporated them into the paper they had written
4. They copied excerpts from printed sources (books, newspapers, magazine articles, etc.) and incorporated them into the paper they had written without citing the sources.
5. They submitted a complete paper downloaded from the Internet, without modifying it, as their own
6. They submitted a paper composed solely of literal excerpts extracted from online sources
7. They did entirely a job from printed sources
8. They used excerpts from their teacher's notes to write a paper, without citing them
9. They admit as appropriate the "cut and paste" method when submitting a paper

The Spanish Public University: A justified proposal to enhance its contribution to economic growth and positioning in international rankings

La Universidad pública española: Propuesta justificada para potenciar su contribución al crecimiento económico y al posicionamiento en los rankings internacionales

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Abstract

With the new millennium a legislative change in the Spanish University occurred. The LOU (2001 and its modification in 2007) repealed the LRU and, thus the organization, objectives and instrumentalization in higher education.

The role of the University must promote technological progress and human and economic growth. However, any academic demand for results in teaching and research mechanism had been practically circumvented until the entry into force of the LOU, since there were no procedures of intrinsic and

comparative measurement of each of them. For some years now, the individual and comparative information has made it possible to evaluate the progress and objectives achieved by each University.

From a strategic point of view and making use of institutional information, mainly the economic one, a quantitative analysis is carried out with panel data (2010-2017). Economic growth and budgetary items of the Spanish public university system are listed below to determine which variables would be more suitable to achieve greater efficiency both in national economic objectives and in international comparative academic improvement, measured with the existing rankings.

In order to achieve these objectives by means of this methodology, three hypotheses are put forward referring to the relationship between the University and economic growth and the identification of strategic variables to promote it, as well as an improvement in the positioning in the international rankings.

Therefore, this study aims to provide the institutional policymakers with instruments to boost support for public higher education institutions and achieve greater efficiency and results in the socio-economic environment and in the international positioning of Spanish public universities.

Keywords: public university, staff costs, master's degree, economic growth, rankings, panel data models.

Resumen

Con el nuevo milenio se produjo un cambio legislativo en la universidad española. La LOU (aprobada en 2001 y modificada en 2007) derogó la LRU y con ello, la organización, objetivos e instrumentalización en la enseñanza superior.

El papel de la universidad debe potenciar el progreso tecnológico y el crecimiento humano y económico. No obstante, cualquier mecanismo de exigencia académica de resultados en docencia e investigación, hasta la entrada en vigor de la LOU, había sido prácticamente eludible ya que no existían procedimientos de medida intrínseca y comparativa de cada una de ellas. Desde hace unos años, la información individual y comparativa, permite evaluar la marcha y objetivos alcanzados por cada Universidad.

Desde un punto de vista estratégico y haciendo uso de la información institucional, fundamentalmente la económica, se realiza un análisis cuantitativo con datos de panel (2010-2017), relacionando crecimiento económico y partidas presupuestarias del sistema universitario público español, para ver que variables serían más aconsejables para conseguir mayor eficiencia tanto en objetivos económicos nacionales, como en mejora académica comparativa internacional, medida con los rankings existentes.

Para conseguir esos objetivos, por medio de esa metodología, se plantean tres hipótesis referidas a la relación de la universidad y crecimiento económico

e identificación de variables estratégicas para impulsarlo, además de una mejora del posicionamiento en los rankings internacionales.

Por tanto, este estudio que pretende dotar a los decisores políticos de instrumentos para impulsar el apoyo a las instituciones públicas de enseñanza superior y conseguir una mayor eficiencia y resultados en el entorno socioeconómico y en el posicionamiento internacional de las universidades públicas españolas.

Palabras clave: universidad pública, gastos de personal, máster, crecimiento económico, rankings, modelos de panel.

Introduction

The Spanish public university, as well as carrying out the task of training qualified professionals for different skilled professional jobs, produces research output, in such a way it plays a fundamental role in the personal, social and innovative evolution and, therefore, in the economic growth of the country.

But, at the same time, the university system is fed back by the positioning of international rankings. Each country must pay annual attention to the situation of its universities in order to strategically support them and improve their positioning, giving clear signs of progress and improvement, leading to greater economic growth for the country and a better international image. In this way, public spending on higher education will be efficient and fully justified.

This analysis empirically justifies the relationship between the Spanish public university and economic growth for the Spanish case (hypothesis, H1). Once this direct relationship has been established, it will be determined which variable, of those that explain the above relationship, is the most efficient for increasing both economic growth (hypothesis, H2) and the improvement in international rankings (hypothesis, H3). Once the empirical study has been carried out, conclusions are drawn for H1 and H2 and, subsequently, for H3, taking into account the above hypotheses and other factors.

The methodology used for the empirical study was the estimation of an econometric model with panel data, considering all the budget items

of the public universities by region. An aggregation of all the universities in each region is carried out, therefore, a sample of 17 regions or Autonomous Communities is available, with a period consisting of the academic years 2010-2011 to 2016-2017.

The aim of this study is to contribute to the definition of strategies that should be applied in the Spanish university system in order to achieve a greater impact on GDP and an improvement in international positioning.

To develop this work, theoretical contributions that support the relationship between university and economic growth will be collected, continuing with the evolution and current situation of the normative regulation and status of the Spanish university (from the OLU to the OLUR), and continuing with the empirical analysis that corroborates these relationships, in order to identify the variables or factors that can serve as an instrument for the public administration to support the university and, as a more relevant consequence, achieve greater economic growth derived from this relationship and improve the image and international positioning of the Spanish university.

The role of public universities in the growth of economies

Universities, rather than being seen as mere institutions of higher education, are increasingly recognised as an important engine of economic growth and development (Anselin, Varga and Acs, 1997; Drucker and Goldstein, 2007; Abel and Deitz 2011; Valero and Van Reenen, 2019). In 1900, only one in a hundred young people in the world was enrolled in universities, but over the course of the 20th century this figure rose to one in five (Valero and Reenen, 2016). Universities stimulate job creation, foster mobility and have an intrinsic social and cultural effect of a kind more commonly described as “quality of life” (OECD, 1982). Therefore, a first hypothesis that would be interesting to test is whether or not the Spanish public university is related to the country’s economic growth (H1):

H1: Spain’s public universities contributes to the country’s economic growth (GDP).

Countries cannot develop without investing in education perceived as a multidimensional process, as it contributes to reducing poverty by increasing productivity and competitive and economic growth (Sianesi and Van Reenen, 2003; Afzalet, Malik, Begum, Sarwar and Fatima, 2012; Bauer, Schweitzer and Shane, 2012). There are several channels through which universities can affect growth (Anselin et al., 1997; Abel and Deitz, 2011). Some of the most relevant are described below.

First, and most obvious, universities can facilitate an *increase in human capital* (Etzkowitz, 2003; Bauer et al., 2012; Barra and Zotti, 2016b; Valero and Van Reenen, 2019).

The term human capital is believed to have been first used in the 1960s and 1970s, when Mincer (1958), Goode (1959), Schultz (1961) and Becker (1975) gave different views on the concept and formation of human capital. However, there are studies that attribute the explicit use of the term to Pigou (1928) and acknowledge that classical economists already referred to the term human capital to describe the knowledge and skills that enable people to create economic value (Nahapiet, 2011). Subsequently, the term gained importance with the emergence of the endogenous growth theory given by Lucas (1988), Romer (1990) and Barro (1990), according to which, the long-term growth rate would also depend on other new factors such as investment in human capital (a factor added to the physical capital already considered previously by neoclassical models).

Universities can contribute to increasing both the supply (Florax, 1992; Shubert & Kroll, 2014; Valero & Van Reenen, 2019) and the demand for human capital by producing degrees and conducting research activities (Abel & Deitz, 2011).

Universities are encouraged to increase the supply of human capital by producing highly qualified graduates and, consequently, competent workers (Varghese, 2007; Bradley, Noonan, Nugent and Scales, 2008) who will contribute significantly to economic development (Florida, Mellander and Stolarick, 2008; Markusen, Wassall, DeNatale and Cohen, 2008; Sacchetti et al., 2009). This can occur in different ways. For example, a skilled worker can promote economic growth, e.g. through improvements in the labour force which, in turn, lead to higher activity rates and lower unemployment rates (Barra and Zotti, 2016a). Similarly, higher-skilled workers are more likely to be involved in the implementation of new technologies and innovative processes (Bartel and Lichtenberg, 1987;

Goldstein, Maier, Luger, 1995; Riddel and Schwer, 2003; Etkowitz and Leydesdorff, 2000; Aghion, Boustan, Hoxby and Vandenbussche, 2009) that will drive productivity improvements and thus economic growth (Hanushek, 2016).

On the other hand, universities can increase the demand for human capital by engaging in research and development activities (Bessette, 2003). For example, universities often use local firms to develop and commercialise products resulting from their research activities. Indeed, as stated by Abel and Deitz (2011), most major research universities have established their own technology transfer offices in an effort to more effectively exploit synergies between university research and commercial product development. Thus, university research activities contribute to the creation of knowledge spillovers in the regional environment, leading to an improvement of local economies (Goldstein and Renault, 2004). In this sense, innovation through university research represents an important channel for creating economic growth (Del Barrio-Castro and García-Quevedo, 2005; Barra and Zotti, 2016b; Valero and Van Reenen, 2019), e.g. through long-term employment and wage increases in sectors closely linked to a local university's innovative strength (Hausman, 2012).

In addition to the generation of human capital, there are other channels through which universities can influence growth. Many authors agree that universities are seen as organisations that use financial and human resources as inputs to *produce different functions or outputs* that can potentially lead to economic development. For example, Goldstein et al., (1995) and Agasisti and Pérez-Esparrells (2010) identify a set of outputs: human capital (mentioned above), knowledge creation, transfer of existing knowledge, production of knowledge infrastructure, research outputs (publications, patents, new products for firms, etc.), services to the community (consultancy to public and private organisations, etc.), capital investment, regional leadership, creation of new firms and productivity gains for firms.

Finally, it is clear that the university teaching staff, through their *research and teaching* work, is a key player in the generation of all the outputs considered above and, consequently, in the generation of economic growth. Accordingly, and taking into account that economic policy makers increasingly identify the expansion of higher education as an attractive government policy (Browne, 2010), considering universities as an engine of local economic development (Abel and Deitz, 2011),

a second working hypothesis can be justified in such a way that the presence of qualified university faculty through increased spending on university staff will be a key tool for generating growth.

H2: Increased spending on university staff contributes to economic growth

Measuring the quality of the Spanish public university system.

The efficiency of higher education institutions has been widely explored in recent decades as a result of a growing interest in improving the performance of the public sector (Guccio, Martorana and Mónaco, 2016). A multitude of international rankings have emerged to measure the efficiency of universities and are becoming increasingly relevant and considered by various stakeholders (Johnes, 2018). However, despite their notorious and growing popularity, these university rankings have been heavily criticised by some authors on methodological grounds (Porter and Toutkoushian 2006; Cremonini, Westerheijden and Enders, 2008; Bornmann, Lutz and Daniel, 2013, among others), and are thus subject to a paradox: the more they are criticised by social scientists and experts on methodological grounds, the more attention they receive in policy-making and the media (Daraio, Bonaccorsi, Simarc, 2015).

Although university rankings first appeared in 1870 (Grewal, Dearden and Lilien, 2008), this phenomenon is relatively recent (Blanco, 2018). Today, one of the most popular rankings among experts is the Academic Ranking of World Universities (ARWU), which has been compiled annually by Shanghai Jiao Tong University since 2003 (Liu and Cheng, 2005). It is compiled from data related to research output and research excellence recognised by prestigious awards or a high number of citations. Initially, its purpose was to categorise world-class universities to assess the gaps in the advancement of Chinese universities and to provide information on the research quality of universities that were considered targets for students and decision-makers in China (Liu, 2009). The ARWU publishes annually accessible raw data, score reviews and rankings and generates a hierarchy, more or less aligned, with perceptions of elite research universities (Docampo and Cram, 2014), for all these reasons, it has been

recognised as the forerunner of global university rankings and the most trustworthy.

While rankings of higher education institutions have generally been targeted at external stakeholders, such as prospective students, in recent years the interest and use of rankings has broadened and they have become a reference tool that attracts the full attention of academics and the public. Today, it is common for staff and managers of higher education institutions to turn to them as an internal audit tool when making important decisions or management policies (Johnes, 2018), as well as governments for the regular publication of world university rankings (Bekhradnia 2016, p. 3).

Internationally, although there are a multitude of rankings, two of the most popular are, apart from the ARWU mentioned above, the QS World University Rankings, produced by Quacquarelli Symonds and published annually since 2004, and the Times Higher Education (THE) World University Rankings, which has been produced and published annually since 2004 in collaboration with Thomson Reuters since 2010 (Johnes, 2018).

One of the items considered to establish the positioning of universities in the aforementioned rankings is the student-teacher ratio, referring to the average number of students per teacher, i.e. the number of students attending a school or university divided by the number of teachers at the institution. The term can also be inverted to create a teacher-student ratio (OECD, 2019).

This ratio is paramount given the growing importance attached to excellence in university teaching as part of the “Scholarship in Teaching and Learning (SoTL)” discourse (e.g. Kreber and Cranton, 2000; Trigwell and Shale, 2004; Fanghanel et al., 2016). But it is important to bear in mind that it is not only the student-teacher ratio that matters in terms of quantity, but that excellence in teaching and teaching quality plays a key role in the success of a university (Klopper and Power, 2014).

EHEA (Bologna) and international rankings

The consideration of the teacher-student relationship, as well as the importance of excellence of teaching staff, takes on greater prominence with the creation of the European Higher Education Area (EHEA), also

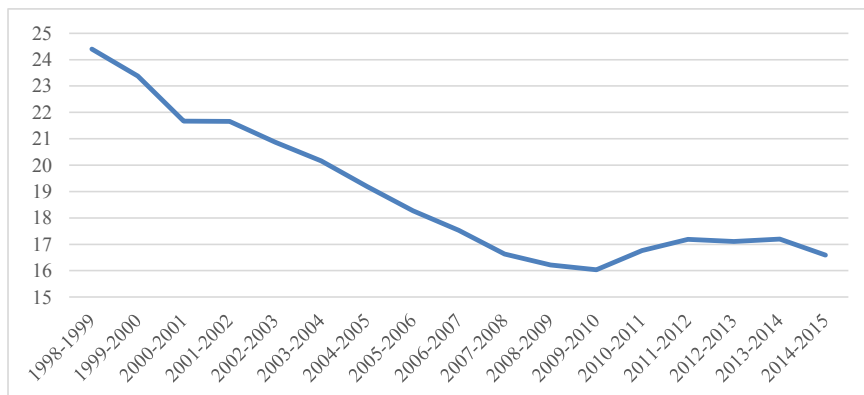
known as the “Bologna Process”. The name derives from the meeting held in Bologna on 19 June 1999, where ministries from 39 European countries decided to launch a common process of restructuring the teaching activities of university systems.

One of the main achievements of the Bologna Process is the structure of curricula: from traditional courses, based on a Bachelor’s degree after 4/5 years, to a Bachelor/Master (BA/MA) structure, more similar to the Anglo-Saxon tradition. In doing so, the Bologna reforms induce a better allocation of students to higher vocational and university courses. The aim of the Bologna Process was to increase the effectiveness and efficiency of undergraduate and postgraduate education in order for universities to pursue academic excellence and research (Agasisti and Dal Bianco, 2009).

In Spain, the Bologna Process materialised with the promulgation, on 21 December 2001, of the Organic Law 6/2001 on Universities (OLU), repealing the then existing Organic Law 11/1983 on University Reform (OLUR). Graph 1 shows that from 2001 onwards, with the implementation of Bologna, there was a growing trend in the number of teaching and research staff hired to adapt to the objectives of the process and to achieve an improvement in the efficiency of the university.

This trend increased until the academic year 2008-2009, when the trend was reversed. The global economic and financial crisis that began in the summer of 2007 also had a pernicious effect on university education, leading to a reduction in public spending on staff, which had an impact on the number of university teaching posts. Although there has been a slight recovery since the 2013-2014 academic year, the number of teaching and research staff is expected to grow further, especially from 2017 onwards, when a constant trend seems to be discernible.

GRAPH I. Student-faculty ratio in Spanish public universities



Source: Prepared by the authors on the basis of National Statistics Institute and Ministry of Education, Culture and Sport.

Graph 1 shows the evolution of the student-teacher ratio¹ in Spanish public universities. The downward trend up to 2009 was favourable, which shows that the objectives set by the Bologna process and the Organic Law 6/2001 of 21 December on Spanish Universities (LOU) were being met. However, it is important to note that the fall in the ratio was accompanied by a decrease in the number of students enrolled.

From 2009 onwards, as a result of the global economic and financial crisis, the ratio began to rise due to a lower supply of teaching and research staff, moving away from the Bologna objectives. During this period, efforts should have been maintained so that the ratio continued to decrease as in previous years or, at least, remained constant but did not increase, as occurred. From 2014 onwards, the ratio decreased again, which is positive. However, from 2015 onwards, although the expected trend seems to be decreasing, it is observed that it will not be at the same level as in previous years, which is worrying.

As a result, in recent years the positions of Spanish universities have been decreasing. Thus, if in 2015 there were 13 Spanish universities among the top 500 in the world in the ARWU ranking, in 2016 they

¹ The student-teacher ratio represents the ratio of students per teacher and is obtained by dividing the number of students enrolled by the number of teachers at the same level. Thus, a high pupil-teacher ratio is considered negative as it means that the same teacher has to teach a high number of students at the same time, which has a negative impact on attention and efficiency.

dropped to 12 and in 2017 and 2018 they fell to 11. Moreover, the best Spanish universities are below the middle of the table. In 2015 there were 5 among the best 250 universities in the world, in 2016 there were 4, and in 2017 and 2018 the number dropped to 3.

However, despite these data, a slight improvement can be glimpsed with respect to 2017. Thus, the best-ranked Spanish universities in the ARWU 2017 were ranked 239th, 261st and 268th, moving up to 179th, 212th and 239th in the ARWU 2018 (Blanco, 2018, p.183). This current improvement in the rankings occurs despite a decrease in the number of teaching staff, which may be due to the improvement in the productivity of the teaching and research staff, a consequence of the ANECA (National Agency for Quality Assessment) accreditation system for the promotion and stabilisation of university teaching and research staff. In other words, although the number of teaching staff is lower, the quality and commitment derived from the current accreditation system is not.

Despite everything described above, it should be borne in mind that the number of teaching staff is not the only element that ensures the effectiveness of the university and, therefore, its better positioning in world rankings, although it is the most efficient of all the possible decisions regarding support and promotion of the university, as is empirically demonstrated in the following section. In other words, there is no single formula or strategy common to all universities to ensure their success, but rather the particularities of each university and various determining factors must be taken into account. In the case of the ARWU, for example, universities are ranked on the basis of their scores on six indicators: students or former students, Nobel Prize and Fields Medal winning professors, highly cited researchers, articles published in Nature and Science, documents indexed in the main citation indexes (SCIE and SSCI), and an institution's per capita academic performance. These indicators are weighted to obtain a final overall score for an institution.

In short, following the above theoretical and empirical justifications, a third study hypothesis (H3) can be put forward by accepting that the effort in spending on university teaching and research staff, in addition to favouring economic growth, would help to improve the international positions of universities:

H3: Increasing spending on staff at Spanish public universities has a positive effect on improving their position in international rankings.

There are universities which, despite having a high student/teacher ratio (higher student/teacher ratio) than the European average, are well placed in the ARWU. This is the case of Greece (301-400th), the Czech

Republic (301-400th), Italy (151-200th) and France (ranked 40th with Pierre and Marie Curie University).

In contrast, there are countries where there is a relationship between the two indicators: Norway (ranked 62nd with the University of Oslo), Sweden (ranked 44th with Karolinska Institute), Germany (ranked 42nd with Heidelberg University), Finland (ranked 56th with the University of Helsinki), Netherlands (ranked 47th with Utrecht University), Estonia and Poland (ranked 301-400th) and Spain (ranked 201-300th). In Spain, with the implementation of ANECA since 2001, the objective requirements of scientific production and teaching experience and quality have placed our university among the world's leading universities in terms of quality scientific production.

In short, competition between universities can be seen visibly in the university rankings. These rankings are "inevitable and probably necessary" (Altbach, 2006, p. 80) and, at present, they have acquired great importance and interest both nationally and internationally (Blanco, 2018, p. 172). Therefore, the Spanish university needs to work actively to position itself correctly and become a university of reference. One of the key elements (although not the only one, nor the one common to all universities) to achieve this is, as has been argued, to optimise the quantity and quality of the teaching staff. Thus, by increasing the presence of teaching and research staff, the student-teacher ratio will be reduced, improving attention to students and, together with the accreditation system established for the professional career, will improve the university's productivity and efficiency.

An econometric study is then proposed to answer hypotheses H1, H2 and H3.

Empirical analysis. Results

This section aims to contrast all the theory presented in the previous sections, empirically demonstrating that the Spanish public university plays a decisive role in economic growth and that the work of the teaching staff is key in this relationship. In this way, the three hypotheses put forward will be answered:

H1. Spain's public universities contribute to the economic growth (GDP) of the country.

H2. Increased spending on university staff contributes to economic growth.

H3. Increasing spending on staff at Spanish public universities has a positive effect on improving their position in international rankings.

The empirical analysis is carried out for the period from 2010 to 2017 (academic years 2010-2011 to 2016-2017). Data are collected for Spanish public universities by aggregating all public universities in all the Autonomous Communities². Specifically, the items included in the budget items of each university are collected in terms of income and expenditure chapters. In addition, other variables from the general environment, such as Gross Domestic Product, population and gross value added of the main sectors of the economy, and others from the specific environment, such as the number of students enrolled in bachelor's degrees, master's degrees and doctoral studies (Table 1), have also been included (Table 1). This analysis is based on the work of Trenado (2018).

TABLE I. Variables considered in the empirical analysis.

Variable		Definition	Units	Database
RC3	Budgets: Revenue	Chap. 3. Fees and other revenue	Euros	From each university
RC4		Chap. 4. Current transfers	Euros	From each university
RC5		Chap. 5. Property income	Euros	From each university
RC6		Chap. 6. Disposal of real investments	Euros	From each university
RC7		Chap. 7. Financial assets	Euros	From each university
RC8		Chap. 8. Financial assets	Euros	From each university
RC9		Chap. 9. Financial liabilities	Euros	From each university
RT		Revenue	Euros	From each university

² Andalucía, Aragón, Asturias, Baleares, Canarias, Cantabria, Castilla-La Mancha, Castilla y León, Cataluña, Ceuta, Comunidad Valenciana, Extremadura, Galicia, La Rioja, Comunidad de Madrid, Melilla, Murcia, Navarra, País Vasco.

EC1	Budgets: Expenditure	Chap. 1. Staff costs	Euros	From each university
EC2		Chap. 2. Expenditure on current goods and services	Euros	From each university
EC3		Chap. 3. Financial expenses	Euros	From each university
EC4		Chap. 4. Current transfers	Euros	From each university
EC5		Chap. 5. Contingency funds	Euros	From each university
EC6		Chap. 6. Real investments	Euros	From each university
EC7		Chap. 7. Capital transfers	Euros	From each university
EC8		Chap. 8. Financial assets	Euros	From each university
EC9		Chap. 9. Financial liabilities	Euros	From each university
ET		Expenditure	Euros	From each university
TE	Students	Total enrolled	No. of persons	Ministry of Education
TED		University degree	No. of persons	Ministry of Education
TEIy2		1st and 2nd cycle	No. of persons	Ministry of Education
TEM		Master	No. of persons	Ministry of Education
TEPHD		PhD	No. of persons	Ministry of Education
POP	Population		No. of persons	INE ¹
GVAA	Gross Value Added of Agriculture, Livestock and Fisheries		Euros	INE
GVAI	Gross Value Added of Industry (including Construction)		Euros	INE
GVAS	Gross Value Added of Services		Euros	INE
GVAT	Total Gross Value Added		Euros	INE
GDP	Gross Domestic Product		Euros	INE

Source: Elaborated by authors based on database of each university, the Ministry of Education and the National Institute of Statistics

The methodology used for the estimation of the econometric models was multivariate regression using panel data estimation. All the possible regressions have been estimated using all the variables considered (Table 1) in order to be able to test the proposed hypotheses. Finally, the valid econometric model³, among all the possible ones, whose estimation is significant, i.e., the model in which the variables contribute significantly to the explanation of economic growth measured through GDP, is the following (Table 2):

TABLE 2. Estimated econometric model

Variable		Coefficient	t	1-p	R2-ajust.	N° Obs./ Groups	
Dependent	GDP					0.9222	118 / 17
Explanatory	EC1	0.0499056	2.88	<0.05			
	EC6	0.0393649	3.27	<0.05			
	TEM	544.3171	3.29	<0.01			
	RC3	0.0560659	3.09	<0.05			
	Constant	0.000000346	5.04	<0.01			

Source: Own elaboration using Stata 10.

According to this estimated model, the variables of the Spanish public university system that provide a positive impulse to economic growth are EC1, EC6, TEM, RC3. In other words, in the 2010-2017 study period, GDP is directly influenced by increases in hiring or increased spending on staff (EC1), by spending on real investment in these public higher education institutions (EC6), by the increase in the professional specialisation of university graduates (TEM) and by the increase in the fees charged by universities to students (RC3).

In short, the empirical model corroborates the theory set out in the previous chapters by demonstrating that the public university has an impact on economic growth, since there is a relationship and correspondence between budget allocations and other university variables and GDP. Furthermore, it has been possible to identify the

³ After performing correlation analyses between explanatory variables, individual statistical significance tests (t) and a sufficiently acceptable level of significance ($p < 0.05$).

most significant elements that could be related to this growth. This result obtained from this quantitative analysis means that H1 cannot be rejected.

However, it is advisable to carry out a sensitivity analysis of the estimated econometric model in order to determine which factors explain the behaviour of GDP for the established period to the greatest extent. In other words, to which variable is GDP most sensitive?

This is possible through the standardisation of coefficients⁴. Moreover, this calculation is important because it allows the design of specific policy strategies to optimise the impact of public universities on economic growth in Spain.

The standardised coefficients for each variable are shown in the following table (Table 3):

TABLE 3. Standardised coefficients of the model

Variable	Coefficient ($\hat{\beta}$)	Standardised coefficients ($\hat{\beta}^*$)
EC1	0.0499056	0.285216043
EC6	0.0393649	0.063025282
TEM	544.3171	0.057849448
RC3	0.0560659	0.112891723

Source: Own elaboration

According to the value of the standardised coefficients, the most efficient economic policy (concerning the public university) to achieve higher economic growth should be implemented through an increase in staff costs (EC1). Subsequently, an increase in university fees (RC3) would contribute to improve university productivity and efficiency and, consequently, economic growth. However, although also with a positive effect, investment in infrastructure (EC6) and the number of Master's

⁴ The standardised coefficients have been calculated directly from the ratio formed by the unstandardised coefficients and the standard deviations of the variables involved:

$$\hat{\beta}_j^* = \hat{\beta}_j * \frac{\text{Desviación típica}(x_j)}{\text{Desviación típica}(y)}$$

students (TEM) would have an impact of less than a quarter of that of EC1 in explaining GDP.

These results allow us not to reject H2 since it is shown that, for the Spanish case, teaching staff is the factor that contributes most to generating economic growth. This allows us to corroborate the theory that a low student-teacher ratio is important to improve university efficiency and productivity.

Conclusions and policy implications and future directions

Considering what has been developed above, a few comments of some relevance can be drawn:

1. The Spanish public university contributes to the economic growth (GDP) of the country. Therefore, H1 is not rejected.
2. There are some specific explanatory variables in the university environment that are related to economic growth: expenditure on personnel (EC1), expenditure on infrastructure (EC6), income from fees (RC3) and the number of students enrolled in official Master's degrees (TEM). All of them are directly related to economic growth.
3. It can be argued that, of these variables, human capital (EC1) is the factor with the largest positive effect on economic growth (i.e. it explains the variability of GDP to a greater extent than the other variables). H2 is not rejected.
4. Due to this relevance, an increase in EC1 may influence the better positioning of Spanish public universities in the rankings as it would lead to reductions in the student-faculty ratio (Figure 1). This is because a higher value of this ratio worsens the positioning of Spanish public universities in the ARWU and THE rankings. H3 is not rejected.
5. In the CRUE5 report, employability and teaching place Spanish public universities in quality positions, with 14 universities in the

⁵ CRUE Universidades Españolas is a non-profit association set up in 1994 and made up of a total of 76 Spanish universities: 50 public and 26 private. It is the main interlocutor of the universities with the central government and plays a key role in all regulatory developments affecting higher education in Spain. It regularly produces studies and reports on a range of subjects for the benefit of the Spanish University System. Its reports "The Spanish University in Figures", which has been carried out since 2000, provides the main facts and figures of the Spanish University System and is a response to the institutional commitment to transparency and accountability to Spanish society (CRUE, 2019).

TOP 0-500 (Hernández and Pérez, 2018, p. 105), with 3 in the TOP 0-100, in the academic year 2016/2017. However, the quality indicator in the ARWU and THE rankings is much lower in terms of research (production and quality), which are the items that have the highest weighting for the overall ranking.

6. The same report shows that Spain, despite being the 13th world power (IMF, 2018), occupies an unadvantageous 13th place in the TOP 500 of the ARWU 2018 ranking, which is explained by its low investment in R&D expenditure, occupying 25th place (World Bank, 2018). The TOP 200 and 500 rankings show that “all countries with R&D expenditure of less than 1.3% only have 1 university in the TOP 200”, which is precisely why Spain should improve its R&D expenditure in order to improve the position of its university system worldwide.
7. Therefore, as a final conclusion of this study, it could be stated that the Spanish public university should experience a growth in human capital, by increasing the number of Teaching and Research Staff (PDI), maintaining the requirements of the professional career system through accreditations (ANECA) to achieve greater economic growth (H1 and H2) and improvement in international rankings (H3), since any PDI working in the public university is obliged, in order to be promoted, to present a quality scientific production in a more than representative quantity (an item included in the reference rankings).

Based on the above conclusions and the considerations of the CRUE report for the period 2016-2017 (Hernández and Pérez, 2018), there is a direct way to improve university quality. This path has several components:

- Scientific production must continue as a requirement of ANECA for accreditation of research teaching staff, as it is beneficial for better teaching quality and more and better scientific production.
- Spending on R&D should be increased. The report refers to the relationship between “ranking position and R&D expenditure”, going so far as to state explicitly that “it is also conclusive that Spain, given its size and the intensity of its R&D activity, could hardly place any more of its universities in the ARWU TOP 200. In fact, of all the countries with an R&D expenditure of less than

1.3%, it only places one” (Hernández and Pérez, 2018, p. 101). Therefore, an increase in R&D spending in public universities, through research projects and grants, is a way to increase the supply of teaching and research staff positions.

- Increasing the supply and quality of Master’s programmes (MMT) is a complementary strategy to achieve higher and better quotas of growth and improvement of the system.
- Improve and increase real investments (EC6), taking into account that the fees paid by students (RC3) could be increased without being a major burden (Spanish university students are subsidised 90% of the cost of the first enrolment fee for all subjects, with no obligation to return this subsidised amount).

As a final reflection, the following recommendation could be summarised to the public authorities. If Spain wants a quality, internationally competitive and efficient university, it must increase, above all, the number of university teaching posts with the same system of accreditation established within the EHEA, in order to achieve more quality scientific production. One possible way would be through an increase in R&D, offering grants and contracts linked to research projects and assistant lecturer positions (lecturers in training to develop their professional careers). In short, the student-teacher ratio, investment in R&D for research, the improvement and expansion of teaching and research facilities and resources, together with a moderate increase in university fees and an improvement in the offer of master’s degrees, will be the path towards a stronger, more competitive, efficient and better positioned university.

In addition, it is necessary to address this support from the public administration, as a negative gap is being created in the recruitment of young faculty that could have a very negative impact on the objectives described in this document in the future.

The evidence that this is the way forward is the reality set out in the QS World University Rankings: “while the top 3 North American universities invest around 100,000 euros per student per year, in Spain the investment is 6,000 euros”. Among the causes of the decline of all the universities, one in particular has been singled out: research. The organisers of the QS warn of the fall in research and development funding and how this has led to a drop in citations per professor.

Considering all of the above, a necessary and profitable future line of research would be to specify the offer of Master's degrees per university, taking into account the socio-economic circumstances and needs of the environment. Consider the current offer and, after an analysis by productive sectors, draw up maps of excess and shortage of Master's degrees at each university. In this way, it will be possible to present a map of Bachelor's and Master's degrees suitable for each autonomous community so that the public university's contribution to regional and global development is much greater.

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The bilingual programme in Madrid and its effects on learning

El programa bilingüe en Madrid y sus efectos sobre el aprendizaje

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Abstract

The Community of Madrid's bilingual programme (MBP) has improved the English level of the students using the Content and Language Integrated Learning methodology (CLIL), by which various subjects of the curriculum are taught in English. Previous studies have analysed whether the MBP reduces the skills of bilingual students in these subjects. Our study completes the previous works using the latest data available with the Evaluation of Competences of the Community of Madrid (ECM) in 2017 and 2019. The ECM is a census test that assesses the competences in various subjects of 6th grade (primary education) and 10th grade (secondary education) students, in addition to obtaining various context questionnaires from students, families, teachers and principals. A database has been developed with the results of the ECM and the characteristics of the students that influence these results. By using the statistical technique difference-in-difference, our study confirms the main conclusions of previous studies, MBP students slightly worsen their skills in subjects taught in English in 6th grade, but this difference is compensated for by 10th grade. Our study also provides a novel conclusion, the significant improvement in English language skills of primary education students is reduced in secondary education.

Key words: bilingual education, CLIL, second language instruction, Madrid Region, student evaluation, primary education, secondary education, Difference-in-Difference.

Resumen

El programa bilingüe de la Comunidad de Madrid (PBM) ha mejorado el nivel de inglés de los estudiantes mediante el uso de la metodología del Aprendizaje Integrado de Contenidos y Lenguas Extranjeras (CLIL), por la que se imparten en inglés varias asignaturas del currículo. Estudios previos han analizado si el PBM reduce las competencias de los alumnos bilingües en esas asignaturas. Nuestro estudio completa los trabajos anteriores al utilizar los últimos datos disponibles con la Evaluación de Competencias de la Comunidad de Madrid (ECM) de los años 2017 y 2019. La ECM es una evaluación censal que evalúa las competencias en varias asignaturas de los alumnos de 6º de Educación Primaria (EP) y 4º de la ESO, además de obtener varios cuestionarios de contexto de los alumnos, familias, profesores y directores. Se ha elaborado una base de datos con los resultados de la ECM y las características de los alumnos que influyen en esos resultados. Mediante el uso de la técnica estadística *Difference-in-Difference*, nuestro estudio confirma las principales conclusiones de los estudios anteriores, los alumnos del PBM empeoran ligeramente sus competencias en las asignaturas impartidas en inglés en 6º EP, pero esta diferencia se compensa en 4º ESO. Nuestro estudio ofrece además una conclusión novedosa, la importante mejora en lengua inglesa de los alumnos de EP se reduce en la ESO.

Palabras clave: educación bilingüe, CLIL, enseñanza de una segunda lengua, Comunidad de Madrid, evaluación del estudiante, enseñanza primaria, enseñanza secundaria, *Difference-in-Difference*

Introduction

Spain is one of the worst performing countries in foreign language as shown by the 2011 European Survey on Language Competences (Jones Kordes and Ashton, 2012), the EFI 2020 or Eurostat. One of the causes is the English teaching methodology employed for many years, which insists upon grammatical content, reading and writing comprehension couple with sparse use of application of the English language in real life

situations (INEE, 2012). One of the most effective educational strategies to improve this problem is the Content and Language Integrated Learning (CLIL), a language immersion method that uses the foreign language as a medium of instruction for some academic content (Eurydice, 2006). In Spain, CLIL programmes were introduced for the first time in 1996 in a few public schools following an agreement between the Spanish Ministry of Education and the British Council. Based on this experience, many autonomous communities have developed their own differentiated bilingual programmes in their territories¹.

The Community of Madrid's bilingual programme (MBP) is one of the most developed in Spain, it has been extended to half of the schools and students, and it is highly demanded by Madrid's families. However, the MBP has been criticized mainly for the learning problems that students have in subjects taught in English. This article analyses these criticisms and performs a statistical analysis on the effect of CLIL in subjects taught in a foreign language. To do this, it uses a database derived from the internal tests that the Community of Madrid has carried out in recent years. The article begins by explaining how the MBP works and the criticisms it has received. After reviewing the existing literature, it presents the database and the difference-in-difference model, with the results of this statistical analysis. Finally, the conclusion is presented.

Characteristics of the Community of Madrid's bilingual programme

The MBP was implemented for the first time in public primary education schools in the 2004-2005 academic year. The implementation of this programme is carried out gradually, starting in the first year of primary education (first grade) and then extending to the remaining years of primary education, one academic year at a time. The first 26 bilingual public schools which began to teach the MBP in the 2004-2005 academic year became fully bilingual in the 2009-2010 academic year, reached six years later when bilingual children reached the sixth grade and

¹ Currently, eleven of the seventeen Spanish autonomous communities offer bilingual education programmes: Andalusia, Aragon, The Canary Islands, Cantabria, Castile and Leon, Extremadura, Madrid, Murcia, Navarre, and La Rioja. Extremadura, Madrid and Murcia started in 2004, and in 2017, the Autonomous cities of Ceuta and Melilla, under the Spanish Ministry of Education, were the last to join this trend.

finished their primary education. The MBP in secondary education began in the next 2010-2011 academic year, following the same progressive implementation during the four years of compulsory secondary education (ESO, seventh to tenth grade). The bilingual programme has also been extended to non-compulsory education: post-compulsory secondary education (eleventh and twelfth grade) in the 2014-2015 academic year, vocational training (2016-2017) and pre-primary education (2017-2018). The grant-maintained private schools began the MBP in primary education in the 2008-2009 academic year and in ESO in 2015-2016. However, in grant-maintained private schools and in non-compulsory education, the MBP is less demanding than the bilingual programme in the compulsory educational stages (primary and secondary) of public schools (Madrid, 2020).

The operation of public bilingual schools is regulated by the Order 5958/2010 (December 7) in primary education, and the Order 972/2017 (April 7) in ESO. All public bilingual schools must teach fully in English subjects that represent at least 30% of the curriculum, including the subject of English as a foreign language, and it is recommended that the subjects of science, geography and history are also taught in English. The subjects of mathematics and Spanish language can only be taught in Spanish. In ESO, two levels of difficulty have been established in the development of the bilingual programme called “Section” and “Programme”. The “Section” is the most demanding option, with more subjects taught in English and an advanced English course taught by specially qualified teachers.

Students do not have any special requirements to access bilingual schools in primary education, and when they finish 6th grade in a bilingual school, they automatically enter the bilingual secondary schools (if they want to). Students from non-bilingual primary schools must hold a CEFR level B1 to access a bilingual school in the first and second year of ESO, and a level B2 to access in the third and fourth year of ESO.

In both, primary and secondary education, teachers who wish to teach MBP subjects must hold a credential to teach in English granted by the Regional Ministry of Education, which is equivalent to level C1,

² Many grant-maintained private schools follow their own bilingual programme differentiated from the MBP, such as the BEDA programme of the Catholic Schools, which is also applied in other autonomous communities, or the CBC programme of UCETAM, a programme that can be complementary to the MBP.

for which they receive a productivity bonus³. Language Assistants are young graduates from English-speaking countries who support the MBP teachers in the classroom. Bilingual schools have special resources such as specific teaching materials, digital whiteboards, certificates of proficiency in English with international recognition for students, and participation in European programmes.

Each year, the Regional Ministry of Education selects the requesting schools that enter the MBP based on various criteria: number of teachers with the credential to teach in English, English level of the management team, acceptance of the educational community to participate in the programme, quality of the project, educational experience of the school, characteristics of the teaching staff, resources available in the school, number of units and students, and balanced geographical distribution of the bilingual schools in the Community of Madrid. The number of new schools included in the MBP has decreased considerably as the target of 50% bilingual schools has been reached. According to the legislation, all the new schools that are created in Madrid must belong to the MBP, so this bilingual programme has grown in recent years only with these new schools.

The main feature of the MBP is the use of the CLIL method. There is a consensus on the advantages that this method has for the effective learning of a foreign language. However, there have also been criticisms of this method and the way it is implemented in the classroom (Hemmi and Banegas, 2021; Cenoz, Genesee and Gorter, 2014; Bruton, 2013). A good part of these criticisms focusses on the intensity that the application of this model should have. Thus, it is discussed whether it is convenient to introduce CLIL in the first years of primary education or even earlier, in pre-primary education, taking advantage of the greater brain plasticity of young children in language learning, or whether, on the contrary, it is more efficient to start applying it only in more advanced courses (at the end of primary education or in secondary education) when students are more mature both in the knowledge of the subjects and in the mastery of the mother tongue (Huguet, Navarro, Chireac, and Sansó, 2009). There is also discussion about how many hours and how many subjects should be under CLIL learning in the total curriculum, as well as the suitability

³ Primary education teachers receive 131.13 euros per month and secondary education teachers (teaching more than ten hours per week) receive 167.84 euros per month, in both cases this amount is approximately 5-6% of their salary.

of certain subjects for the application of CLIL learning, for example, the core and basic subjects of learning (mathematics or science) and the subjects related to the culture of the country (geography and history) (Acción Educativa, 2017). Another criticism is whether the entire subject should be taught exclusively in English, or whether it is better to teach parts of the subject in English and parts in the mother tongue (Antón, Thierry, Goborov, Anasagasti and Duñabeitia, 2016). One last criticism relates to the teachers. The need to teach classes in English implies that the teachers must have a very high level of language competence in addition to being competent in their subject. A balance needs to be struck between the two skills, as the option of recruiting new teachers proficient in the foreign language may have the danger of shedding teachers who are not proficient in the foreign language but who are very competent in their subject.

Of the many ways that there are to implement a CLIL programme, the MBP has chosen the following: to introduce bilingualism from the early educational stages; to seek a balanced percentage between the subjects taught in the mother tongue and in the foreign language (from 30% to 50%), although each subject is taught only in one language; to recommend the teaching in English of science, geography and history, and preventing it in mathematics and Spanish; and to improve the English language proficiency of existing teachers with the credential to teach in English system and the support for their teaching work with the Language Assistants. The question then arises, are these the best possible options to improve the linguistic and educational level of Madrid's pupils? One way to answer this question is to analyse the practical effects of the MBP in the educational system, seeing whether it meets its objectives or whether it generates educational problems in its development.

Studies on the impact of MBP on academic performance

Subjects taught in English are a critical element of MBP because the academic level may be worsened by the fact that they are taught in a foreign language for both students and teachers. A comparison of the test outcomes between students from bilingual and non-bilingual schools would allow to measure the effect of the programme on the performance of the subjects. However, this comparison cannot be made

directly because the students are not randomly assigned between the two groups (bilingual and no-bilingual schools) and because their personal characteristics are different. There are various statistical techniques which make possible this comparison between heterogeneous groups, applying quasi-experimental comparison techniques that allow to bring the data closer to what would have been a theoretical experiment (not real) where the students were randomly assigned between MBP and non-bilingual schools. The most used techniques are the difference-in-difference (diff-in-diff), matching students with the same characteristics, fixed effects models, and multinomial logit models.

Table I shows the characteristics of the studies that have been carried out on the effects of MBP. These studies use different external tests, both those carried out by the Community of Madrid (CDI, ECM) and the international evaluations (PISA, PISA for Schools). Most of the studies use the diff-in-diff technique.

TABLE I. Studies on the effect of MBP on subjects taught in English

	Publica-tion	Cour-ses	Database	Statistical technique	Conclusions
[1]	Brindusa, Cabrales and Carro (2016)	6th PE	- CDI 6th EP (2009, 2010 and 2011)	Difference-in-difference: schools before and after entering the MPB, compared to non-bilingual schools	- Negative effect of learning a subject in English (no effect on subjects taught in Spanish) - Greater effect in the first cohort of bilingual students, which is reduced in the second cohort - Greater effect on students with parents of lower educational level
[2]	Ruiz (2017)	6th PE	- CDI 6th EP (2009, 2011, 2013 and 2015)	Difference-in-difference: schools before and after entering the MPB, compared to non-bilingual schools	- Negative but small effect of learning a subject in English (no effect on subjects taught in Spanish) - The negative effect is concentrated on the average students
[3]	Quecedo (2015)	6th PE	- CDI 6th EP (2008-2013)	Difference-in-difference: schools before and after entering the MPB, compared to non-bilingual schools	Negative but small effect of learning a subject in English (no effect on subjects taught in Spanish)
[4]	Sotoca and Muñoz (2015)	6th PE 4th ESO	- CDI 6th EP (2010) - Diagnostic test 4th ESO (2010) - Internal evaluation	Matching of students from bilingual centers with students from non-bilingual centers with similar characteristics (Nonequivalent Control Group) (only East of Madrid Este schools)	- No differences between schools in 4th ESO - Better results in Spanish language and mathematics in 6th PE - In the internal evaluation, teachers in non-bilingual schools score their students higher in knowledge of the environment (science) and in English

[5]	Tamariz and Blasi (2016)	6th PE 4th ESO	- CDI 6th EP (2009-2015) - PISA for Schools (2009 y 2013)	Mixed Effects Models: combines the inference of the main effects with estimates of the characteristics of secondary sources, such as the school or the municipality	- The MBP does not reduce the learning of contents in the rest of the subjects (whether taught in Spanish or English) - The slight worsening in the acquisition of knowledge in science in PE, is compensated later in ESO - The MBP does not explain the differences in the results of the evaluations, the explanation is in other elements (public or private school, and geographical area)
[6]	Montalbán (2016)	4th ESO	- PISA 2009 - PISA for Schools 2013	Difference-in-difference: schools before and after entering the MPB, compared to non-bilingual schools	The MBP neither improves nor worsens the learning of contents in Spanish language, mathematics (taught in Spanish) and science (taught in English) - Strong positive impact on the enjoyment time and reading habits of students in bilingual centers
[7]	García-Centeno, de Pablos, Rueda-López and Calderón (2020)	6th PE	- ECM 2017	Multinomial Logit Model: measures the variables that influence the probability of obtaining better results	- The MBP neither improves nor worsens the learning of content in Spanish language, mathematics (taught in Spanish) and science (taught in English) - Significant improvement of the level of English in bilingual centers

CDI: Essential Knowledge and Skills Test of the Community of Madrid

ECM: Evaluation of Competences of the Community of Madrid

MBP: Community of Madrid's Bilingual Programme

PE: Primary Education

ESO: Compulsory Secondary Education

Most of the studies conclude that bilingual schools obtain better results in the English subject, and similar results in the subjects taught in Spanish (mathematics and Spanish language). However, the conclusions of the studies are not unanimous on whether MBP has a negative effect on subjects taught in English, a lack of unanimity that also exists in studies conducted on other bilingual programmes in Spain (Lorenzo and Granados, 2020; Barrios and Milla, 2020) and in the rest of the world (Dallinger, Jonkmann, Holm and Fiege, 2016; Surmont, Struys, Van Den Noort and Van De Craen, 2016; Bialystock, 2007).

All the studies, except for [6 and 7], use data from the CDI test that was carried out in the Community of Madrid between 2005 and 2015, focusing on the 6th year of primary education test. The articles [1, 2, 3 and 5] conclude that the MBP reduces the results of the science subject taught

in English in that course (Knowledge of the Environment), although it is a small effect. However, the rest of the articles [4, 6 and 7] draw the opposite conclusion, that is, the MBP has no effect, neither positive nor negative, in this subject. On the other hand, there is unanimity in the articles that analyse the 4th year of ESO evaluation [4, 5 and 6] that the MBP does not reduce the competences in the subjects taught in English. According to [5], although in primary education there is a slight reduction in the results of the science subject taught in English, in ESO the slight loss of knowledge of this subject is recovered. In other words, there is a temporary deterioration that is recovered in the long term, throughout the compulsory educational stage (primary education and ESO). In fact, [1] admit that the loss of knowledge is greater in the first cohort of bilingual students who reached 6th year of primary education (in the 2009-2010 academic year) than in the second cohort (2010-2011), due to the improvement in the development of the MBP, mainly in the English level of the teachers, whose demands were notably increased in 2005 after the first year of the programme's development.

Evaluation of Competences of the Community of Madrid Database

To complete all the previous studies, we will use the Evaluation of Competences of the Community of Madrid (ECM) database⁴. The Spanish Organic Law 8/2013 for the Improvement of Educational Quality (LOMCE) introduced these individualized assessment tests for all 3rd, 6th (primary education) and 10th (ESO) grade students. The tests have no academic effects on students. Each autonomous community prepares its own tests, following the general guidelines of the central government. In the Community of Madrid, these tests have been held from the 2015-2016 academic year to the 2018-2019 academic year. For our analysis, we will use the tests carried out in public schools in 6th (primary education) and 10th (ESO) grade in 2017 and 2019⁵. The tests evaluate Spanish

⁴ More detailed information on these tests can be found on the website of the Community of Madrid: <https://www.comunidad.madrid/servicios/educacion/educacion-cifras>

⁵ From the academic year 2019-2020, these tests are no longer carried out, except in the 3rd year of primary education, where subjects taught in English are not assessed. Of the four years in which the test was conducted, the first year (2016) it was only conducted in primary education, and in the third year (2018), the database does not allow to connect the results of the students with their questionnaires, so only the 2017 and 2019 tests are suitable for this study.

language, English language, mathematics, science (only in 6th grade), and geography and history (only in 10th grade). The ECM has several advantages over the CDI: it includes an English test; assesses 10th grade students, in addition to 6th grade students, which allows analysing the entire period of application of the PBM; it is a test of competencies and not a test of knowledge and contents like the CDI, so it reduces the influence of the language as it is carried out in Spanish, specifically the possible lower command of the specialized vocabulary in Spanish of the MBP students; and finally includes numerous context questionnaires much richer in information than in the CDI. From these questionnaires, 4 databases have been prepared (6th and 10th grade in 2017 and 2019) with the following variables:

- Personal characteristics of the students and their families
 - Female: 1 if female and 0 if male.
 - Birth quarter: from 1 (January to March) to 4 (October to December).
 - Immigrant: the student's country of birth as an approximation to the immigrant status, 1 if they were born outside of Spain and 0 if they were born in Spain.
 - Early education: 1 for pupils entering pre-primary education before the age of 3 (first cycle of pre-primary education), 2 if they enter at the age of 3 to start the second cycle of pre-primary education, and 3 if they enter later.
 - ESCS: Economic, Social and Cultural Status (PISA), is calculated with three variables related to family background: parents' highest level of education, parents' highest occupational status, and material and cultural possessions at home (books, digital devices, computer, internet, press). Positive values indicate above average status, negative values indicate below average status.
 - Absence: takes values 1 to 4 from lowest to highest level of absenteeism; in 6th grade, the frequency of missing class is asked (1 never or almost never, 2 once a month, 3 once every 2 weeks, and 4 once a week) and in 10th grade, full days that the pupil has missed during the term without justification (1 less than 2 days, 2 between 2 and 4, 3 between 4 and 6, and 4 more than 6 days).

- Homework: weekly time spent by the pupil on school work (study or homework) outside school hours, with a value of 1 if less than 4 days a week, 2 from 4 to 5 days, and 3 more than 5 days.
- Repetition: 1 if the pupil has repeated 1 or more years, and 0 if the pupil has never repeated a year.
- Bilingual: 1 if the pupil attends a MBP school in the year being assessed, and 0 if the student's school is not part of a bilingual programme.

■ Students' academic outcomes

- The average score of each student has been obtained through the Item Response Theory (IRT), similar to PISA, which gives a result of mean 500 and standard deviation 100. The competences are Spanish, English, mathematics, science (in 6th grade) and history (in 10th grade).

Tables II and III show a descriptive analysis of the variables for the 6th (primary education) and 10th (ESO) grade courses in 20196.

TABLE II. Descriptive statistics of the 6th grade (primary education) test, academic year 2018-2019

	All schools	Minimum	Maximum	Bilingual	No bilingual	Bilingual vs. No bilingual
	(1)	(2)	(3)	(4)	(5)	(6)
A. Student characteristics						
Female	0.48	0	1	0.48	0.47	-0.32***
	[0.50]			[0.50]	[0.50]	(-0.05)
Birth quarter	2.52	1	4	2.50	2.54	-0.03
	[1.10]			[1.11]	[1.10]	(-0.02)
Immigrant	0.06	0	1	0.04	0.07	-0.19*
	[0.29]			[0.21]	[0.25]	(-0.11)

⁶ The same analysis has been performed for the 2017 database, which is not included due to lack of space, whose results are similar to those of 2019.

Early education	1.81	1	3	1.71	1.91	-0.13***
	[0.94]			[0.90]	[0.97]	(-0.03)
ESCS	-0.27	-3.57	1.75	-0.11	-0.43	0.07***
	[1.05]			[0.98]	[1.09]	(-0.03)
Absence	1.24	1	4	1.19	1.27	0.09*
	[0.67]			[0.60]	[0.72]	(-0.05)
Homework	2.26	1	3	2.28	2.25	-0.05
	[0.76]			[0.75]	[0.77]	(-0.03)
Repetition	0.17	0	1	0.13	0.20	0.38***
	[0.37]			[0.34]	[0.40]	(-0.09)
Bilingual	0.43	0	1	1	0	
	[0.49]					
B. Student outcomes						
Spanish	486.45	-108.48	1,001.73	497.28	477.29	-0.0049***
	[100.46]			[95.56]	[103.55]	(-0.0003)
Mathematics	480.04	0	955.68	494.36	468.05	-0.0004
	[94.07]			[94.81]	[91.75]	(-0.0003)
English	481.74	23.59	792.20	531.11	439.49	0.0165***
	[101.18]			[87.95]	[92.24]	(-0.0004)
Science	483.25	-104.08	1,007.46	487.89	479.36	-0.0045***
	[98.91]			[96.14]	[101.01]	(-0.0003)
Observations	46,141			19,610	26,531	46,141

Notes: Column 1: mean and variance (standard deviation of the mean in brackets) of the students' characteristics and their outcomes. Columns 2 and 3: minimum and maximum. Columns 4 and 5: mean and standard deviation (in square brackets) of each group of students in bilingual and non-bilingual schools. Column 6: estimates of the coefficients of one logistic regression of the students' personal characteristics and their outcomes, on the indicator of their belonging to a MBP school in the year studied. Standard errors in parentheses. ***, ** and * reflect a significance level of 1%, 5% and 10% respectively.

TABLE III. Descriptive statistics of the 10th grade (ESO) test, academic year 2018-2019

	All schools	Minimum	Maximum	Bilingual	No bilingual	Bilingual vs. No bilingual
	(1)	(2)	(3)	(4)	(5)	(6)
A. Student characteristics						
Female	0.50	0	1	0.51	0.50	0.21***
	[0.50]			[0.50]	[0.50]	(0.04)
Birth quarter	2.52	1	4	2.52	2.53	-0.01
	[1.11]			[1.11]	[1.10]	(0.02)
Immigrant	0.14	0	1	0.12	0.17	-0.14**
	[0.35]			[0.32]	[0.37]	(0.07)
Early education	1.51	1	3	1.46	1.56	-0.09**
	[0.62]			[0.59]	[0.64]	(0.04)
ESCS	-0.24	-4.22	2.02	-0.05	-0.41	0.07***
	[0.97]			[0.93]	[0.97]	(0.02)
Absence	1.72	1	4	1.66	1.76	0.07***
	[0.98]			[0.94]	[1.01]	(0.03)
Homework	1.86	1	3	1.92	1.80	0.01
	[0.91]			[0.91]	[0.91]	(0.02)
Repetition	0.10	0	1	0.07	0.12	0.24***
	[0.30]			[0.26]	[0.32]	(0.08)
Bilingual	0.45	0	1	1	0	
	[0.50]					
B. Student outcomes						
Spanish	476.14	-126.53	946.46	485.52	467.09	-0.0019***
	[98.21]			[96.52]	[98.97]	(0.0003)
Mathematics	476.33	87.30	968.92	482.35	470.59	-0.0011***

	[94.18]			[93.86]	[94.13]	(0.0003)
English	479.08	149.94	813.12	515.43	444.18	0.0118***
	[101.45]			[94.05]	[95.90]	(0.0003)
History	474.69	105.45	983.02	477.80	471.70	-0.0037***
	[97.67]			[95.10]	[99.99]	(0.0003)
Observations	32,683			14,544	18,139	32,683

Notes: Column 1: mean and variance (standard deviation of the mean in brackets) of the students' characteristics and their outcomes. Columns 2 and 3: minimum and maximum. Columns 4 and 5: mean and standard deviation (in square brackets) of each group of students in bilingual and non-bilingual schools. Column 6: estimates of the coefficients of one logistic regression of the students' personal characteristics and their outcomes, on the indicator of their belonging to a MBP school in the year studied. Standard errors in parentheses. ***, ** and * reflect a significance level of 1%, 5% and 10% respectively.

The above tables show that students in bilingual schools perform better in all the skills assessed, with very high differences in English and lower differences in the other subjects; these differences decrease as the MBP develops, since they are greater in primary education than in secondary education (section B, columns 4 and 5). However, the above outcomes comparison is not related to whether the students attend the MBP, because they have not been randomly assigned between bilingual and non-bilingual schools, and because the student characteristics that influence their outcomes are different and statistically significant between both groups, as reflected in the logistic regression (section A, column 6). In order to infer a relationship between bilingual education and students' academic outcomes, it is necessary to use statistical techniques to correct endogeneity problems, such as the difference-in-difference technique.

Difference-in-difference Model

To develop the difference-in-difference technique, we use a database that brings together the 2017 and 2019 tests. We only use students from non-bilingual schools in 2017. Of all these students, the treatment group is the students at the schools that received the "treatment" because they enter the MBP in 2018 and 2019. The control group is the remaining students in non-bilingual schools. Tables IV and V show the averages of

the two groups (treatment and control) in the year before the treatment (2017) and in the year after this treatment (2019).

TABLE IV. Descriptive statistics (means) of the treatment and control groups for the diff-in-diff regression (6th grade primary education)

	2017 (before Treatment)		2019 (after Treatment)		Diff-in-Diff
	Mean of Treatment group	Mean of Control group	Mean of Treatment group	Mean of Control group	
A. Student characteristics					
Female	0.48	0.48	0.48	0.47	0.01
Birth quarter	2.52	2.52	2.54	2.54	0.00
Immigrant	0.09	0.08	0.04	0.07	-0.03
Early education	1.90	2.01	1.66	1.91	-0.14
ESCS	-0.25	-0.41	-0.06	-0.43	0.21
Absence	1.22	1.26	1.16	1.27	-0.06
Homework	2.19	2.27	2.17	2.25	0.00
Repetition	0.16	0.20	0.10	0.20	-0.06
B. Student outcomes					
Spanish	482.59	471.97	495.64	477.29	7.74
Mathematics	473.01	466.41	491.58	468.05	16.93
English	447.66	438.42	529.67	439.49	80.95
Science	485.49	476.88	484.07	479.36	-3.90
Observations	1,418	20,728	2,113	21,882	

Treatment group: students in non-bilingual schools in 2017 and in bilingual schools in 2019

Control group: students in non-bilingual schools in 2017 and 2019

Diff-in-Diff: (Mean 2019 - Mean 2017 of the treatment group) - (Mean 2019 - Mean 2017 of the control group)

TABLE V. Descriptive statistics (means) of the treatment and control groups for the diff-in-diff regression (10th grade ESO)

	2017 (before Treatment)		2019 (after Treatment)		Diff-in-Diff
	Mean of Treatment group	Mean of Control group	Mean of Treatment group	Mean of Control group	
A. Student characteristics					
Female	0.47	0.49	0.51	0.50	0.02
Birth quarter	2.51	2.52	2.53	2.53	0.01
Immigrant	0.19	0.18	0.15	0.17	-0.03
Early education	1.54	1.58	1.52	1.56	0.01
ESCS	-0.24	-0.37	-0.20	-0.41	0.08
Absence	1.64	1.62	1.79	1.76	0.01
Homework	2.02	1.94	1.82	1.80	-0.06
Repetition	0.09	0.10	0.11	0.12	0.01
B. Student outcomes					
Spanish	490.77	475.80	475.13	467.09	-6.92
Mathematics	486.12	477.57	479.86	470.59	0.72
English	465.94	450.58	458.98	444.18	-0.56
History	488.61	471.68	486.67	471.70	-1.96
Observations	2,990	16,664	3,128	18,106	

Treatment group: students in non-bilingual schools in 2017 and in bilingual schools in 2019

Control group: students in non-bilingual schools in 2017 and 2019

Diff-in-Diff: (Mean 2019 - Mean 2017 of the treatment group) - (Mean 2019 - Mean 2017 of the control group)

The difference-in-difference technique overcomes two endogeneity problems. The first is the non-random selection of the schools that enter the MBP, which is overcome by comparing a centre with itself. This is reflected in section B of the “Diff-in-Diff” column. However, a second problem of endogeneity remains, since the announcement that a school

is going to enter the MBP may alter the type of student that is enrolled in that school. Indeed, section A of the “Diff-in-Diff” column shows that the characteristics of students in schools who entered the MBP in 2018 or 2019 have changed slightly after entering its school in the programme, compared with students in non-bilingual schools (control group). To correct this problem, the diff-in-diff technique allows the incorporation of the students’ characteristics that influence their academic results. For this purpose, the following Ordinary Least Squares (OLS) regression is estimated:

$$Y_i = \alpha 2019 + \beta T_i + \gamma (2019 \times T_i) + \delta X_i + \zeta_0 \quad (1)$$

We have estimated four regressions on the academic outcomes of each student (Y_i). The four groups of students are determined with 2 dichotomous variables: T takes a value of 1 if the student belongs to the treatment group and 0 for the control group; 2019 takes a value of 1 for the treatment group and the post-treatment control group (test of 2019), while 0 are those students who took the test before the treatment (in 2017). We want to estimate the effect that entering the MBP had on the academic outcomes, considering the existing changes in these results, both between the treatment and control groups (T), and from one year to another (2019). The variable that reflects these effects is γ , which is obtained by multiplying the 2 previous variables, so that this variable takes a value of 1 for the treatment group that performs the assessment in 2019. X_i are the observable characteristics of the students and their families. Tables VI and VII show the results of the estimations of the model expressed in equation (1).

TABLE VI. Diff-in-diff estimation in 6th grade (primary education)

	Spanish	Mathematics	English	Science
2019	2.23	-4.61***	-1.63	-1.75
	(1.66)	(1.64)	(1.57)	(1.70)
Treatment group 2017 and 2019	9.77**	12.87***	9.96**	7.29*
	(4.21)	(4.18)	(3.98)	(4.34)

Treatment group 2019	-11.44**	-6.40	61.17***	-21.57***
	(5.52)	(5.46)	(5.21)	(5.68)
Female	44.48***	-19.11***	22.49***	-0.98
	(1.564)	(1.54)	(1.48)	(1.61)
Birth quarter	-6.10***	-5.17***	-4.63***	-6.14***
	(0.71)	(0.70)	(0.67)	(0.73)
Immigrant	-3.63	-0.27	3.74	-6.17*
	(3.25)	(3.22)	(3.08)	(3.34)
Early education	-2.87***	-3.27***	0.22	-1.57*
	(0.90)	(0.88)	(0.85)	(0.92)
ESCS	22.40***	21.18***	26.89***	22.69***
	(0.82)	(0.81)	(0.78)	(0.85)
Absence	-12.01***	-13.48***	-12.76***	-12.95***
	(1.63)	(1.60)	(1.54)	(1.67)
Homework	6.06***	7.65***	4.75***	5.59***
	(1.08)	(1.07)	(1.02)	(1.11)
Repetition	-53.50***	-46.62***	-58.32***	-42.31***
	(2.77)	(2.73)	(2.61)	(2.85)
Constant	507.2***	528.6***	482.6***	533.5***
	(4.21)	(4.16)	(3.98)	(4.32)
Observations	13,273	13,329	13,249	13,317
R square	0.19	0.14	0.22	0.12

Standard errors in parentheses. ***, ** and * reflect a significance level of 1%, 5% and 10% respectively.

TABLE VII. Diff-in-diff estimation in 10th grade (ESO)

	Spanish	Mathematics	English	History
2019	-13.48***	-6.84***	-3.96***	-8.30***
	(1.61)	(1.61)	(1.52)	(1.64)
Treatment group 2017 and 2019	9.03***	5.04*	6.70***	6.04**
	(2.74)	(2.77)	(2.60)	(2.81)

Treatment group 2019	-3.26	2.02	-7.11*	6.66
	(4.24)	(4.21)	(3.98)	(4.32)
Female	19.91***	-26.16***	9.56***	-18.37***
	(1.49)	(1.49)	(1.40)	(1.52)
Birth quarter	-2.37***	-1.21*	-1.56**	-3.00***
	(0.67)	(0.67)	(0.63)	(0.68)
Immigrant	-8.88***	-10.65***	2.65	-1.21
	(2.23)	(2.22)	(2.10)	(2.27)
Early education	-3.40***	-4.31***	-2.69**	-2.77**
	(1.29)	(1.29)	(1.22)	(1.32)
ESCS	14.55***	14.78***	26.53***	19.22***
	(0.73)	(0.73)	(0.69)	(0.74)
Absence	-8.75***	-7.30***	-9.58***	-8.95***
	(0.87)	(0.86)	(0.81)	(0.89)
Homework	10.22***	6.56***	9.14***	9.46***
	(0.84)	(0.84)	(0.79)	(0.86)
Repetition	-39.43***	-17.72***	-52.25***	-32.11***
	(2.65)	(2.63)	(2.48)	(2.71)
Constant	497.9***	515.3***	483.7***	510.9***
	(3.69)	(3.68)	(3.47)	(3.76)
Observations	13,865	14,007	14,075	13,826
R square	0.13	0.10	0.21	0.13

Standard errors in parentheses ***, ** and * reflect a significance level of 1%, 5% and 10% respectively.

The variables of the students and their families' characteristics are mostly statistically significant and take the expected values according to the literature that analyses the influence of these characteristics in the students' academic outcome. Female students obtain better results in language skills (Spanish and English) and worse in the rest, a result in line with previous research that points to a greater predisposition of women towards language skills and of men towards mathematics and science (OECD, 2019; Baye and Monseur, 2016; Knollenberger, Rodriguez-

Planas and Sevilla, 2016). Being born in a late term, that is, being one of the youngest in the class, has a negative effect on academic results, and this effect is greater in primary education than in ESO because this disadvantage is diluted over time, a conclusion already confirmed by previous literature (Attar and Cohen-Zada, 2017; Kawaguchi, 2011; Puhani and Weber, 2007). Immigrant status reduces academic results, although its effect is not statistically significant in primary education, while in ESO it is statistically significant in Spanish and mathematics. OECD research using PISA data shows this ambiguous effect of immigration on students' academic performance (OECD, 2015)⁷. Later attendance in pre-primary education negatively influences outcomes, and this effect is maintained over time, although the magnitude of the effect is not very large, a similar conclusion to the previous literature (Gutiérrez-Domenech and Adserá, 2012; Elder and Lubotsky, 2009). The student's attitude, measured both by their level of absenteeism and by the completion of homework, has the expected effect on the outcomes, negative if the absence is higher and positive if the student does more homework, although the magnitude of both effects is not very big. The influence of doing homework at home on school performance has been verified with PISA data (OECD, 2014), as well as the decrease in academic outcomes when students accumulate unexcused absences (Santibanez and Guarino, 2020; Choi and Calero, 2013; Calero, Choi and Waisgrais, 2010).

The two variables that most influence academic results are, in the first place, the social, economic, and cultural level of the families (ESCS), with a positive and very large influence on the students' outcomes, only surpassed by the repetition. The PISA reports have highlighted this important influence (OECD, 2019). Finally, repetition is the variable with the most important influence on outcomes, negatively affecting the academic performance of the students, as indicated in the previous literature (OECD, 2020 and 2011; Miñaca and Hervas, 2013; Fernández-Enguita, Mena and Riviere, 2010).

The variable of most interest, highlighted in the two previous tables (*Treatment group 2019*), measures the effect that the introduction of the MBP has on the students' outcomes. The results are different in primary

⁷ In Madrid, being an immigrant does not significantly reduce the academic result due to the degree of motivation of these students and their origin, since many immigrants in Madrid are children of expatriate workers with a high-income level, and it is this income level, captured by the ESCS explained below, the determinant of their academic results.

education than in ESO. In primary education, the MBP improves the students' level of English very significantly, more than 60 points (60% of the standard deviation). Regarding the subjects taught in Spanish, the difference between MBP students and those who do not participate in this programme is not significant in mathematics, and in Spanish it is significant and negative for MBP students, although the magnitude of the difference is not very big. Finally, the subject taught in English (science) shows a negative and significant effect for participating in the MBP. In summary, the MBP in primary education improves language skills in English at the cost of slightly reducing skills and knowledge of subjects taught in English and reducing skills in Spanish language even more slightly. These conclusions are similar to those of previous studies (Table I).

In secondary education, the effect of the MBP on the academic outcomes is not statistically significant in all subjects, except in English language, where the statistical significance is low (10%), and the magnitude of the difference is very small. These results are different from those obtained in primary education. Although the subjects taught in English are different in ESO (geography and history) than in primary education (science), other previous research had reached the conclusion that the MBP does not reduce competencies in science in ESO (Sotoca and Muñoz, 2015; Tamariz and Blasi, 2016; Montalbán, 2016). All of this only confirms that, although there may be a slight worsening of results in bilingual schools for subjects taught in English, this worsening is temporary, limited to primary education, but in the long term, throughout the entire period of the compulsory education stage (primary education and ESO), the MBP does not reduce knowledge and skills in these subjects.

The difference-in-difference analysis in ESO also shows that the MBP students do not improve their English level compared to the other students, even their result is slightly lower, while in primary education the improvement was very big. This is a novel and quite surprising result, that the previous literature had not studied, and that has several explanations. One is that the power to improve the English language in MBP is greater in primary education than in ESO, when students are already more concerned with other subjects, or already have a high level of English achieved in primary education. In addition, ESO students in bilingual schools are divided into two groups, "Section" and "Programme", being "Programme" the least demanding option and the one chosen by the

students with the worst academic results. For this reason, if Section and Programme students could be differentiated (which the database used cannot do), probably Section students would comparatively improve their results in English, being the Programme students those who reduce the average of all MBP students. Another explanation would be that students from non-bilingual schools make more effort in the ESO stage to improve their English level, compared to students who already have a higher English level. There is also a group of students who drop out of the MBP at the end of the 6th grade to attend a non-bilingual school, among other reasons, because they consider that their English level is already very high, and they prefer to focus on studying the rest of the subjects in Spanish. These students would raise the English level in ESO schools that do not belong to the MBP.

Conclusions

The Community of Madrid's bilingual programme improves the English level of the students by using the CLIL system in which various subjects of the programme are taught in English. However, this system may reduce students' outcome in those subjects taught in a non-mother tongue. The statistical analysis carried out in this article, using the difference-in-difference technique, confirms the results already obtained in previous studies: the MBP causes a slight decrease in competences in the subjects taught in English in primary education, but in the long term, upon finishing compulsory education at the end of ESO, this decrease is offset. Our analysis has yielded a novel conclusion that previous studies had not detected: the improvement in English of the MBP occurs mainly in primary education and not in secondary education.

The MBP is part of an educational policy of the Madrid Regional Ministry of Education, to offer differentiated and specialized educational centres so that each student can choose the centre that best suits his or her circumstances. Thus, Madrid has developed centres with a Baccalaureate of Excellence, Technological Innovation Institutes, Sports Specialization Institutes, Integrated Music Centres, and Integrated Professional Training Centres. At the same time, educational policies in Madrid promoted that all schools could offer their own programmes, changing the curriculum to suit the characteristics of their students. All

the above, combined with greater freedom of school choice to introduce a certain degree of competition between schools, seeks to achieve a varied educational supply that will adapt and better meet the needs and demands of students.

The MBP fits into this educational policy of the Community of Madrid. If a student can improve his or her level of English outside the school, for example, with private classes, he or she can choose not to go to a bilingual school in order not to reduce the academic level in certain subjects such as science or history, while students who value more to acquire a higher level of English, although there is a possible loss of academic level in some areas, can opt for the MBP schools. In fact, this seems to be one of the reasons why the English level of the MBP in secondary education does not improve as much as in primary education, namely the option to choose between the “Section” and the “Programme”, and the fact that some students in MBP primary schools decide to attend a non-bilingual school in ESO because they have already acquired a high level of English and prefer to concentrate on the competences of the rest of the subjects.

The comparative analysis of the students’ academic outcomes of bilingual and non-bilingual schools is not the only way to analyse the MBP. Thus, there are several studies on the satisfaction of students, families and teachers with the MBP expressed through surveys (Chaieberras and Rascón, 2018; Gerena Ramírez-Verdugo, 2014; Halbach and Fernández, 2011). These studies generally find a high degree of satisfaction with the MBP of most of the respondents, especially in its ability to improve the level of English and in the degree of motivation and improvement of the self-esteem of the students when using English, with teachers who are also highly motivated and enthusiastic about the development of the programme. But these studies also reflect some complaints from respondents regarding the development of the MBP. Teachers complain about the few opportunities to participate in exchange programmes, the scarcity of training in the English language and the teaching methodology to carry out their work, the lack of materials and time to prepare and develop their teaching in English and, in general, they highlight the need for more support and training for their work in the MBP. The students reflect some doubts about their competences in their mother tongue (Spanish), and many of them are not interested in using more English in the classes because they consider that they already have a very high English level. This is related to one of the conclusions of our article,

that the MBP does not comparatively improve the level of English in the MBP secondary education with respect to the students in non-bilingual schools, because if the programme achieves a high level of English in primary schools, this gives less room for improvement in ESO, so some students will prioritize the competencies of other subjects over the English they already master, and the room for improvement for students who have not been to a MBP school is greater.

A final element of criticism about MBP is its effects on the global educational system. Even if students in bilingual schools improve their English skills without reducing their grasp of other subjects taught in English, the bilingual programme can negatively affect the entire education system. If the bilingual programme is not applied to all students (the MBP only applies to half of them), the programme may cause an increase in the segregation of students based on their membership in the MBP and an overall reduction in the quality of the education system. Several studies have analysed school segregation in the Community of Madrid, relating it to the MBP (Cortázar and Taberner, 2020; Mediavilla, Mancebón, Gómez-Sancho and Pires, 2019; Sanjuán, Martínez and Ferrer, 2019). However, these studies only show a correlation between the development of MBP and increased segregation, but do not perform statistical analysis that demonstrate causality. This causal analysis is a promising future element of MBP research.

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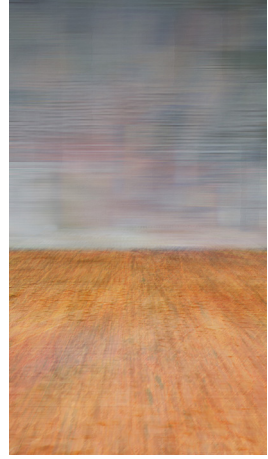
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Reviews

Gómez-Hurtado, I. and García-Prieto, F.J. (Coords.) (2021). *General Didactics Manual for Diversity*. Madrid: Pirámide. 273 pages. ISBN: 978-84-368-4414-6

Inclusive education is today one of the main challenges and, in turn, demands of today's society and of school, understood as a space that respects and values diversity, offering personalised attention so that each student can achieve the optimal development of their cognitive, physical, social and emotional abilities.

The book reviewed, coordinated by Dr. Inmaculada Gómez-Hurtado and Dr. Francisco Javier García-Prieto, provides an integral response to diversity in the formal field of education through all its elements, starting from an epistemological and legislative analysis of each of them for their subsequent projection in practice. Each of its twelve chapters has a series of preliminary questions to consider before reading, as well as initial and summarising activities to be implemented in university classrooms for initial teacher training.

The content of the book could be organised in two blocks according to the subject matter of the chapter. The first of these, which covers the first to the eighth chapter, including the eleventh, corresponds to an analysis of all the components of the educational curriculum and the proposal of alternatives for their adaptation to attention to diversity. Thus, the first two chapters deal with the organisation of the school, understood as a community nucleus in which collaborative didactic actions must be implemented to connect all the members and elements of the educational community so that the student can learn.

Chapters three and four describe the curricular content and the didactic models, proposing the need to establish a dialogue between teachers and the curriculum so that the latter is integrative, connecting all curricular areas based on motivating centres of interest, and inclusive, adapting to the pupils' learning rhythms, needs and interests.

Chapter five, in turn, describes all the curriculum elements and how to implement them in inclusive educational proposals, paying special attention to evaluation as a key element to guide the educational process and motivate students.

Chapters six, seven and eight explain the different aspects of the teaching methodology that can be followed, including approaches, methodological strategies and techniques, didactic resources and spaces, groupings and times for learning. In addition to the use of active learning methodologies and the provision of balanced and accessible spaces, special mention is made of the current inclusive educational paradigm, known as UDL (Universal Design for Learning), which proposes multiple forms of representation, action, expression and involvement so that all students can learn and communicate their learning.

Chapter eleven, on the other hand, addresses coeducation as a key to equity and inclusion, starting from the conceptualisation of gender studies terms and presenting real coeducational experiences and recommendations to educate in and for equality at school.

The second thematic block, which includes chapters nine, ten and twelve, deals with the practical aspects of inclusive education from different standpoints. Chapter 9 describes various online teaching experiences during the lockdown. Due to the COVID-19 pandemic in different ECE (Early Childhood Education) and primary schools, highlighting challenge-based learning and gamification using digital resources. Chapter ten, on the other hand, sets out a characterisation of gamification as a technique to improve content accessibility and motivation, providing an example of gamification for schoolchildren and another for teachers in initial training. Finally, the twelfth chapter of the book consists of the development of a complete didactic programme based on project work to be implemented in a 6th grade primary school classroom.

For all of the above reasons, this manual is configured as a tool with immense potential for teachers in initial and in-service training to develop, based on theoretical concepts, practical experiences and reflections, educational actions that serve all of their students under the principles of inclusion and equity.

Elisa Arroyo Mora

Santos Rego, M. A., Lorenzo Moledo, M., y Mella Núñez, Í. (2020). *Service-learning and university education. Making competent people*. Barcelona: Octaedro. 193 pp. ISBN: 978-84-18615-00-9

Service-learning is assumed in this collaborative work as an alternative to conventional learning, which is integrated into the university curriculum and intensifies the relationship between the academic and civic-social dimensions. Thus, the complexity of this methodology, where the inclusion of community life presents a notable contribution to the academic level, establishes an intentionally educational link between university and society.

This volume, whose timeliness is more than justified in the context of a more committed and socially responsible university, is postulated as a review of the capacity of service-learning to address an integral conception of learning, contributing, in the terms referred to by the authors, to the formation of “competent people”.

Structurally, the publication is articulated around four chapters. The first presents a timely analysis of Higher Education in the 21st century, noting its evident transformation to configure a university in which research is oriented to the transfer of knowledge and, therefore, to social progress. It also refers to the role of the Academy in the provision of initiatives and strategies of a pedagogical nature necessary for a new educational paradigm to have its consequent reflection in the reality of the classroom, and not only in official documents and speeches.

In the second chapter, the main epistemic axes of service-learning are addressed, together with the possibilities of this methodology in the new university model that emerges after the appearance of the European Higher Education Area, insisting on the capacity of service-learning to move from a model of university extension to another centered on social responsibility. However, as the authors point out, this requires a solid base inside and outside the university that allows for adequate levels of complicity between the agents and bodies involved.

The third chapter provides information on the keys to the implementation of a service-learning project. Specifically, it describes the phases that guide its development and analyzes in a pristine way the reflection of the experience as an essential and unavoidable step in the construction of the learning derived from this methodology. Likewise, the need to establish an evaluative continuum in its application is alluded

to, as well as the effects that this methodology has for the development of certain competencies of interest for university students, informing of its contribution to an integral formation from the civic-social, academic and professional perspective.

The fourth and last chapter covers the institutional dimension of service-learning, in order to give continuity to the use of this type of initiative, promoting the commitment of the different institutions that guarantee its sustainability in university education. In this regard, and as stated, it is desirable to obtain results from the implementation of service-learning projects and programs, regardless of their disciplinary field, which generate a breeding ground for an adequate management of change in Higher Education.

Ultimately, this is a well-articulated work that identifies important coordinates that serve as a guide and orientation for the advancement and progress of service-learning in the university, an institution called to train people not only intellectually. And this is precisely what moves the authors, whose work demands an epistemically reasonable pretension which, as has been made clear, is none other than the one of providing credit and practicality to the social and civic dimension of university education.

Jesús García-Álvarez

Santos-Rego, M.A., Lorenzo-Moledo, M., and Miguez-Salina, G. (2022). *Funds of family knowledge and educational intervention*. Madrid: Narcea. 141 pp. ISBN: 9788427728820

Funds of Knowledge have their origin in anthropology, although pedagogy has progressively incorporated them into its object of study as a way to inquire cultural and/or family groups with specific characteristics. In this sense, the anthropology of education should be pointed out as an area of confluence of both scientific disciplines, where the focus is on the processes of cultural acquisition and transmission for which educational processes are essential. The book reviewed herein aims to contribute to this field of knowledge based on the rigor and evidence that the authors demonstrate in their discourse, backed by their research career in the Educational Sciences.

As stated in the introduction of the book, its structure is based on an epistemological umbrella rooted in the anthropology of education and intercultural pedagogy. The journey through the 141 pages starts with the theoretical bases of the funds of knowledge and ends with their practical implication, based on an example developed with a Romany ethnic group in Pontevedra (Galicia).

Following this path, the authors are able to raise multiple questions in the reader's mind, which are resolved with a rather vehement dialectical solvency. For example, they are able to justify the usefulness of this work approach in the field of family education, which is addressed in the second chapter of the book. They show how the Funds of Knowledge can serve as a meeting point for the socio-educational intervention with learning communities where families, schools and communities are involved in joint projects with pedagogical purposes.

Continuing the journey, Professors Santos-Rego, Lorenzo, and Miguez take us to the next section, the third chapter, where the reader is invited to make a global tour of different and valuable experiences that have been based on this epistemic approach to achieve successful interventions with various cultural groups. Thus, the journey takes us from Spain to New Zealand or Australia, on the opposite side of the world, passing through Uganda and also stepping on the American continent, where it was initially applied. These professors from the University of Santiago de Compostela provide the reader with specific cases that will help them to glimpse the usefulness of this resource in its social dynamics.

Still on the subject of Funds of Knowledge, there are many advantages of their use, such as the empowerment of the participants in their everyday lives, or the significant progress towards the improvement of equity, contributing to the construction of the long-awaited social justice. The use of this resource contributes to a solid progress in the knowledge of some specific groups, such as students in vulnerable situations and their family environment, as described in this book.

It is particularly relevant to mention the contextual moment when this book was being written. In a climate of international conflict, where it has been demonstrated that education for peace remains a necessity, along with the socio-economic situation resulting from COVID-19, social inequalities have worsened, highlighting the deficiencies of a system that seemed unquestionable. In this framework, educators will have to shape their intervention based on the principles of equity and justice,

where knowledge of these individual and/or community risk situations becomes the pillar on which to build solid socio-educational programs.

In short, we are faced with a work with a marked pedagogical character (that is, normative and constructive), which paves the way to include the Funds of Knowledge as a resource at the service of education. To this end, the authors propose a well-justified practice that will be replicable in other areas and, finally, sustainable in its applicability.

Alexandre Sotelino Losada

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