ARTICLE

<https://doi.org/10.1057/s41599-021-00736-7>

OPEN

Active teachers' perceptions on the most suitable resources for teaching history

Catalina Guerrero-Romera^{1✉}, Raquel Sánchez-Ibáñez¹, Ainoa Escribano-Miralles¹ & Verónica Vivas-Moreno¹ ¹

The objective of this article is to analyze teachers' assessment of various resources used to teach history. The research methodology is of a quantitative nature with a non-experimental design using a questionnaire with a Likert scale. The non-probabilistic sample comprises 332 history teachers in Primary and Secondary Education in Spain. The analyses carried out are descriptive and inferential. The results indicate that the surveyed teachers value better the resources that imply a greater involvement of the students in the teaching of history and therefore more active methodologies. Specifically, the most valued resources were heritage, artistic productions and museums and, the least valued, video games, textbooks, and applications of historical content for mobile devices and tablets. The study concludes that heritage is a growing educational resource among teachers and shows that teachers are moving away from their perception of resources, which involve a more traditional methodology of teaching history.

¹Universidad de Murcia, Murcia, Spain. ✉email: cgromera@um.es

Introduction

Today, there is a wide variety of didactic resources for the teaching of history. The new technologies that burst onto the scene at the beginning of the 21st century have highlighted the importance of using resources that encourage student participation (Colomer and Sáiz, 2019). The use of web applications, tablets or mobile devices, virtual reality, video games, audiovisual material are some of the resources that have been incorporated in the Primary and Secondary Education classrooms in recent years (Acosta, 2015; Isbell et al., 2018; Camuñas and Cambil, 2019; Orts, 2019; Rivero and Feliu, 2017).

Several authors demonstrate, through their studies and experiences, the usefulness of their development in social science classrooms. The use of the video game is presented as a resource that allows work on heritage in the classrooms for the learning of citizenship and history, in a global, holistic, systemic and integrating way. López-Benito et al. (2015) support the need and possibility of making use of digital resources of museums and heritage spaces for the development of heritage education in the classroom through m-learning. In this respect, there are several experiences and studies where the use of video games is promoted in classrooms as a learning strategy to achieve their own and common objectives and goals among students and the group. Gamification is seen as a teaching technique that uses the game as a strategy to achieve some learning objectives (Ayén, 2017; Trujillo, 2017). However, the use of the various resources provided by Information and Communication Technologies (ICT) by themselves cannot improve the teaching and learning process. ICTs are a means that contribute to the teaching-learning process, but only with an appropriate teaching approach and methodological strategies will student learning be forthcoming (Ibáñez-Etxeberria et al., 2018; Miralles et al., 2019).

The many studies developed from the didactics of the social sciences have determined that the textbook is the most used resource in Compulsory Secondary Education, followed by Primary Education (Gómez et al., 2015; Gómez and Miralles, 2016, 2017). Similarly, the work of Sáiz (2011) determines that the teaching of history privileges an idea of hegemonic and traditionalist history, where the use of the textbook continues to prevail as the principal teaching resource, in line with the indications of Valls (1999), Valls and López-Facal (2011), Cox et al. (2020), and Pei-Fen (2020).

The school handbook continues to be the main teaching resource used in the classrooms because it offers security to the teacher and guarantees compliance with the curriculum. However, its exclusive use as the only resource implies a certain “deprofessionalization” of the teaching staff, in addition to the fact that it makes the student perceive the knowledge transmitted as finished and static knowledge, which does not admit criticism nor can it be reconstructed (Molina and Alfaro, 2019).

Another resource used in the history classroom is heritage understood in its holistic, integrative and systemic conception (Cuenca, 2009; Jiménez et al., 2010; Cuenca and Estepa, 2011). Heritage has educational potential in itself because it is presented as an open book with many readings (Santacana, 2012). Archeological heritage or artistic and cultural history, for example, can be an essential element for students to better understand the past: it allows an approach to history from the concept of practical learning (hands on), thinking (minds on) and feeling (hearts on), since it connects materiality with problem solving and historical empathy (Vicent et al., 2015; San Martín and Ortega-Sánchez, 2020).

The use of heritage in the classroom has great potential since, through experimentation with this historical science and work with its objects, students can construct history experimentally and develop historical skills (Egea et al., 2018; Forrest and Weldrake, 2018). Estepa (2019) defends the use of heritage, primary sources,

and oral sources in their various aspects in order to promote research proposals in the school that contribute to the understanding of current and historical societies. This implies initiating the students in research work, following the procedures and techniques of the social sciences, which enable them to reflect, act, and intervene in the resolution of social problems (Cuenca-López et al., 2017; Bizzio et al., 2018; Estepa and García, 2020).

The adoption of these resources and strategies has meant a methodological change in recent years which, slowly but surely, is replacing the traditional methodology in the stages of Primary and Secondary Education. Although it is true that the use of the master class or the textbook is very common in the teaching of history, there are many teachers who combine this more traditional form of teaching with other methodological strategies focused on students (Gómez et al., 2017). We are moving towards a model that favors student interaction and that is based on the teaching of different skills, introducing research methods, presenting social knowledge as a process under construction, and bestowing the social sciences a practical and collaborative character (Gómez and Rodríguez, 2014).

The use of a particular teaching model or approach may be related to the use of a particular method, strategy, or resource in the classroom. At present, there are various experiences and studies that establish the use of alternative resources to the school manual (over-exploited in history classrooms), which diversify the strategies employed based on educational innovation, mainly on research. Some of these are the use of historical sources, historical, artistic and cultural heritage, and video games (Corti et al., 2016; Gómez et al., 2016, 2017b; Rodríguez and Ruiz, 2016; Miralles et al., 2017).

In this sense, Gómez and Miralles (2016) defend the learning of history understood from the work with historical sources (oral, documentary, artistic productions), that is, with those resources through which students can carry out an analysis of the information the resources present and so put into practice the skills and competences related to history. The use of these resources makes it possible to work in the classroom on the scientific method or the historian’s method, where inferences and historical evidence as a competence of historical thinking is worked on: elaboration of hypotheses, argumentation and search for evidence, analysis of sources and reasoning (Seixas and Morton, 2013; Gómez et al., 2017b; Gómez and Sobrino, 2018).

At present, there is a wide range of didactic resources available to Primary and Secondary teachers of History which allow the advancement of a more active teaching methodology, leaving behind the teaching practice based on the master class, the class notes and the textbook. Based on this approach, the central question in this research is: What resources do active teachers consider most relevant for the teaching of history? To address this question, the research is structured around three specific objectives:

- SO1. Analyze how teachers rate the didactic resources for teaching History according to their sex.
H₀: There are no statistically significant differences in teachers’ ratings according to their sex.
H₁: There are statistically significant differences in the ratings of teachers according to their sex.
- SO2. Analyze how teachers rate the didactic resources for teaching History according to their age.
H₀: There are no statistically significant differences in teachers’ ratings according to their age.
H₁: There are statistically significant differences in the ratings of teachers according to their age.
- SO3. Analyze how teachers rate the didactic resources for teaching History according to the stage of education in which they teach.

H₀: There are no statistically significant differences in teachers' ratings according to the education stage.

H₁: There are statistically significant differences in the ratings of teachers according to the education stage.

Methods

The research is a non-experimental quantitative study using a Likert scale questionnaire, through an ex post facto study (Ato et al., 2013). Designs using questionnaires or surveys are widely used in the field of education, since they are applicable to multiple problems and allow information to be collected on a large number of variables (Sapsford and Jupp, 2006). The informed consent of the participants was obtained for this purpose. In addition, a favorable report was received from the Research Ethics Committee of the University of Murcia.

Participants. The sample is made up of 332 active teachers. Of these, 170 (51.2%) teach history at the primary school level (6–12 years), 157 (47.3%) at the secondary school level (13–16 years), and 1.5% did not specify which. Although it is not a probabilistic study, the participants come from 10 of the 17 autonomous communities that make up the Spanish state (Andalusia, Asturias, the Canary Islands, Castile and Leon, Valencia, Extremadura, Galicia, Madrid, Murcia, and the Basque Country). According to official data from the Spanish Ministry of Education, the number of non-university general education teachers is 712,181 professionals in the 2019–2020 academic year, so the sample size is within a 5% margin of error and a 95% confidence level. This is within the advisable range for research in the areas of Education and Social Sciences (3–5%), which makes the conclusions drawn from the research useful (López-Roldán and Fachelli, 2015). Of the 332 participants, 175 (52.7%) are women and 156 (47%) men, and one person (0.3%) checked the “Other option” box. Finally, the age ranges of the participants can be seen in Table 1.

Data collection tool. The questionnaire, designed within the framework of a national research project coordinated by three research groups from Spanish universities in the area of Didactics of the Social Sciences, is called “Questionnaire on ways to approach the teaching of history” and is made up of a Likert-type response scale of five values. It is an additive scale with an ordinal level, which is also called a summative scale, since the score of the respondent is the sum of the scores obtained in each item (Namakforoosh, 2005; Guil, 2006). In this case, five answer options have been chosen following the recommendations of authors such as Bisquerra and Pérez-Escoda (2015) and Matas (2018).

The first part of the questionnaire is for identification. It has 10 fields to collect socio-demographic information (sex, age, academic training in Higher Education, educational stage of the teacher, administrative situation, and ownership of the educational center, province where the center is located, years of experience as a teacher, other educational levels taught, participation in educational innovation projects and their scope). The second part consists of

two blocks. The first, entitled “About teaching approaches”, is made up of 20 items that characterize three teaching models. This block corresponds to the questionnaire “Approaches to Teaching Inventory (ATI)” published by Trigwell and Prosser (2004). Specifically, for this work we have used the Spanish version of the ATI questionnaire proposed by Monroy et al. (2015), which limits the items to 20 and the statements of these have been adapted to refer to the subject of history.

The second block of the questionnaire, “Opinions and conceptions about the teaching of history and educational skills”, is made up of 58 items grouped into five dimensions with a Likert-type scale of five values ranging from “barely relevant” to “highly relevant”. In the first dimension, respondents are asked about the relevance of certain historical themes when teaching the subject. The second dimension asks about the development of historical competencies in the classroom. In the third dimension, we ask about the suitability of certain didactic resources for teaching history. The fourth dimension addresses the instruments used to evaluate history, and in the last dimension, the teacher's treatment of conflicting historical topics in the classroom is tackled. This second block is based at the theoretical level on the “Beliefs History Questionnaire”, used by VanSledright and Reddy (2014) and on the identification of historical competencies carried out by Wineburg (1991) and Seixas (1993) and developed in the Spanish context by Domínguez (2015), Sáiz and López-Facal (2015), and Carretero (2019). In this work, specifically, we will present the results of the items of the third dimension of the second block, related to the opinion of teachers on the relevance of certain teaching resources when teaching history. From the socio-demographic information obtained, gender, age, and the educational stage in which history is taught will be used as independent variables.

The first block of the survey was validated by the authors of the proposal on which it is based (Monroy et al., 2015) and its validity has been confirmed in the successive works published by its authors (Trigwell and Prosser, 2004; Trigwell et al., 2005). The second block of the survey was validated for clarity and relevance, by a panel of six expert researchers in social science education from various Spanish universities. The information from a validation guide with Likert-type answers (1–4) was analyzed by descriptive statistics and agreement among judges. All the items of the second block obtained scores higher than 3, so after interpreting the validation results, the statements of the items of the questionnaire were not modified.

Procedure and data analysis. To collect information, the members of the project's research team from various Spanish universities were contacted and the surveys were distributed in paper format and online. The protocols for collecting and processing the information received a favorable report from the research ethics committees of the coordinating universities. The descriptive and inferential analyses were carried out using Mplus 7.0 (Muthén and Muthén, 2015). In particular, in descriptive analyses, taking into account that these are ordinal variables, response frequencies have been calculated. Secondly, inferential analyses (*U* of Mann–Whitney and *H* of Kruskal–Wallis) were run to seek and identify statistically significant differences between the variables of the questionnaire. When significant differences were found, if the factor had more than two levels, a post-hoc test was run to determine between which levels the differences were.

Results

The results are given below with respect to the specific objectives of the study.

- SO1: Analyze how teachers rate the didactic resources for teaching History according to their sex.

Table 1 Age intervals of the participants.

Age	n	Valid percentage
20–29	26	7.83
30–39	83	25
40–49	104	31.32
50–59	94	28.31
60 or over	24	7.22
NA	1	0.30
Total	332	100

Table 2 Frequency of responses from surveyed teachers.

Resource	1%	2%	3%	4%	5%
Textbooks	6.7	13.1	34.6	31.5	14.1
Websites	0.9	6.1	16.4	46.7	30
Documental sources	0	3.1	16.2	43.7	37
Oral sources	2.1	6.3	19.3	39	33.2
Press	1.8	5.8	21.6	46	24.7
Teachers' notes	2.7	10	30	40	17.3
Museums	0	1.8	10.9	40.5	46.8
Cinema and documentaries	0	3.9	12.4	41.1	42.6
Historical novels, comics and children's literature	1.2	4	23.4	45.3	26.1
Popular magazines	3.3	5.8	21.5	43.9	25.5
Videogames	17.6	20.6	29.7	22.1	10
Festivals and traditions	1.8	10.6	26.9	39.3	21.5
Virtual recreations	0.6	5.5	17.3	38.9	37.7
Applications for devices	8.5	7.6	24.8	38.8	20.3
Artistic production	0	0.9	10	43.2	45.9
Heritage	0	0.6	6	31.4	61.9

Table 3 Summary of the inference results by sex.

Item	W	p-value
Applications for devices	11,751.5	0.0355
Artistic productions	11,183.5	0.00242
Cinema and documentaries	11,608	0.0144
Festivals and traditions	10,949	0.00153
Heritage	11,186.5	0.0013
Popular magazines	11,178	0.00467
Virtual recreations	10,557.5	0.000404

The descriptive analysis reveals that 93.3% of the teachers surveyed said that heritage is a resource that is between adequate and very adequate for teaching history, followed by 87.3% who think the same about museums. On the other hand, 38.2% consider video games as resources that are not or not very suitable for the teaching of history and 19.8% think the same of textbooks (Table 2).

Inferential analysis using Mann-Whitney's *U*-test reveals statistically significant differences ($p < 0.05$) between male and female respondents in seven of the resources used for teaching history. Therefore, in these seven resources, the null hypothesis is rejected in relation to the assessments of the teachers surveyed in terms of the variable sex (Table 3).

- SO2: Analyze how teachers rate the didactic resources for teaching History according to their age.

On comparing the results according to the age range of the respondents, the Kruskal-Wallis *H* test indicates that there are significant differences in relation to the assessment of the use of oral sources (Sig. = 0.015), video games (Sig. = 0.012) and local and regional traditional festivals and celebrations with historical content (Sig. = 0.001), as resources for teaching history.

Post-hoc analyses reveal that, with respect to the use of oral sources, the greatest differences ($Z = 59.030$ and Sig. = 0.020) are between teachers over 60 years old and those between 20 and 29 years old. In the use of video games, the greatest differences ($Z = 50.893$ and Sig. = 0.017) occur between teachers over 60 and those between 30 and 39. Finally, in relation to the use of local and regional festivals and traditions with a historical content as a didactic resource, the significant differences ($Z = 55.663$ and Sig. = 0.000) occur among teachers aged 50–59 and those

Table 4 Results of the descriptive analysis of resources.

Resource	n	Mo	Me
Applications for devices	330	3	3
Artistic productions	331	4	4
Cinema and documentaries	331	4	4
Documental sources	327	4	4
Festivals and traditions	331	4	4
Heritage	331	4	4
Historical novel, comics and children's literature	329	4	5
Museums	331	4	5
Oral sources	331	4	4
Popular magazines	330	4	4
Press	328	3	3
Teachers' notes	330	4	4
Textbooks	327	4	4
Videogames	330	4	4
Virtual recreations	329	4	5
Websites	330	5	5

Table 5 Median and inference by education stage.

Resource	W	p-value
Artistic productions	11,193	0.00719
Historical novel, comics and children's literature	15,448	0.00433
Popular magazines	14,821	0.04
Primary documental sources	11,128.5	0.0186
Virtual recreations	15,371	0.00418
Websites	15,460	0.0038

aged 30–39. Hence, for these three resources the null hypothesis is rejected.

- OE3. Analyze how teachers rate the didactic resources for teaching History according to the education stage.

The descriptive analysis reveals that teachers of both stages indicate that the most appropriate resource for teaching history is nearby historical and cultural heritage, artistic productions and museums and other places of heritage interpretation. In contrast, the least suitable resources are videogames, textbooks, and cell phone and tablet applications with historical and heritage content (Table 4).

The comparison between the teachers of the Primary and Secondary Education via inferential analysis reveals that there are significant differences ($p < 0.05$) in the relevance given to six of the teaching resources (Table 5). Therefore, in these six, the null hypothesis is rejected in relation to the evaluation of the resources. In addition, with the exception of primary documental sources and artistic productions, the rest of the didactic resources are better valued by primary education teachers than by secondary ones (Table 5).

Discussion and conclusions

The results of this research show the opinions of the primary and secondary education teachers about the most suitable resources in the teaching of history. The data confirm the change in teachers' perception of the most relevant resources for the teaching of social sciences and point to the need for a new methodological approach in the current model of historical education.

Although these changes are still insufficient to put an end to the pre-eminence of a traditional methodology in the classroom (Oller, 2011; Sáiz, 2011; Sáiz and Fuster, 2014; Sáez et al., 2017; Gómez et al., 2018; Verdú et al., 2018).

In this sense, our research has shown that there is a greater consideration of didactic resources that imply a greater understanding and construction of content, and a greater role for students, as the studies of Prats (2016) and Mira and Sáiz (2020) affirm. The study notes that the resources valued as most appropriate for teaching history are those related to historical and cultural heritage, artistic productions and museums and other places of heritage interpretation (Gil et al., 2016; Chaparro and Felices de la Fuente, 2019; Lucas and Delgado-Algarra, 2020).

This confirms that heritage is considered by teachers as a valuable resource and educational content to be used both in the classroom and outside it, since it allows them to connect with the local and regional environment closest to the students (Santacana and Llonch, 2015; Vicent et al., 2015; Fontal and Ibáñez, 2017; Forrest and Weldrake, 2018; Estepa, 2019). It is significant that although these elements are highly valued as appropriate by teachers, some authors claim that it is one of the least used resources for teaching and a broader didactic approach is needed in its use (Cuenca and Estepa, 2011; Gómez et al., 2016; Miralles et al., 2017).

Felices-De la Fuente et al. (2020) in a study with teachers in training found similar results and pointed out that future teachers consider that there is a gap in their initial training that should be addressed and include university educational practices based on real experiences, as well as didactic training on heritage.

On the other hand, Castro-Fernández et al. (2020) commented on the reasons that could condition the use of heritage in the classroom, the disconnection between research and the teaching of heritage. Molina and Muñoz (2016) also highlighted as possible causes, that teachers perceive work with heritage as an extra-curricular element, the density of the subject matter and the lack of time to design and develop resources and activities, as well as the lack of specific training, both initial and continuous, for teachers on more innovative teaching approaches and strategies in heritage education (Castro and López, 2019).

Furthermore, there is research that shows a close link between the positive evaluation of heritage and the use of active learning methodologies, as well as with a conception of history as critical knowledge (Miralles et al., 2017; Bartie et al., 2018).

In this respect Estepa et al. (2008) concluded that a somewhat reductionist view still predominates in some teachers. Molina and Muñoz (2016) also indicated that the active teaching staff had a more fragmented and academic vision of the use of heritage in the classroom, incorporating it in a merely descriptive and very static way.

Likewise, higher scores are given to the use of historical novels, comic books and children's literature, which reveals an increased interest in narrative and, in particular, graphics and their application to the classroom as a teaching resource (Blay, 2015; Delgado, 2017). This is significant given that there are also studies that confirm the relationship between the positive evaluation of comics and video games and the use of more innovative strategies (Cózar-Guitérrez and Saéz-López, 2016; Rodríguez and Ruiz, 2016; Miralles et al., 2019).

In contrast, the resources that teachers value least as adequate for teaching History are video games, textbooks, and applications for cell phones and tablets with historical and heritage content. These data also indicate that, in spite of some studies affirming the need or benefits of introducing innovations and a greater use of technologies in the teaching of the social sciences (López-Benito et al., 2015; Colomer and Sáiz, 2019; Colomer et al., 2018), the teachers in the study did not coincide. One of the reasons may be what Colomer et al. (2018) reports in relation to the insufficient preparation of teachers in digital skills oriented towards the teaching of history (Miguel-Revilla et al., 2020).

This fact leads Ramírez and González (2016) to indicate that no real implementation of these has yet taken place in Spain. Other authors such as Felices-De la Fuente et al. (2020), Gómez et al. (2020), and Colomer et al. (2018) although in the context of teacher training, argue the need for training and point out that the digital competence of future teachers must be increased and they must be trained in the use and knowledge of specific technological resources for the teaching of heritage and history. Miralles et al. (2019) also relate the implementation of active methodologies and the use of innovative strategies and approaches and the development of digital competences.

Furthermore, there are studies which have pointed out that a traditional, outdated, memory-repetitive model is still being applied which does not favor the use of digital resources (Jiménez and Cuenca, 2015). Similarly, the use of video games is a more complex form of teaching which requires a greater level of knowledge and experimentation in order to be able to relate it and adapt it to the contents to be taught (Cuenca and Martín, 2010; Quintero, 2018). In this way, the use of digital devices can have a value that is not only motivating or recreational, but also didactic and that reinforces a historical education based on competences (Felices-De la Fuente et al., 2020; García-Martín and García-Sánchez, 2017).

Studies reveal that the textbook is the resource most used by history teachers (Gómez et al., 2015; Gómez and Miralles, 2017) and that in practice there is still a traditionalist teaching, despite the low value given by teachers to this educational resource together with their notes (Gómez et al., 2015; Bel, 2017; Gómez and Miralles, 2017; Molina and Alfaro, 2019; Strapek, 2019).

This indicates that teachers are aware that it is not the most appropriate or relevant resource for the teaching of history, and hence it is necessary to look in depth at the reasons or motives that lead teachers to persist in using textbooks as frequently as they do. In this sense, a question of interest is to reinforce and increase the educational level of teachers, especially by providing them with didactic training that contributes, among other things, to overcoming the difficulties in designing alternative educational activities to the textbook (Miralles et al., 2017). Training that also includes good practices and examples to implement active methodologies in the classroom for the teaching of history and the use of more innovative resources and with greater student participation in their learning process (Colomer et al., 2018; Colomer and Sáiz, 2019; Castro and López, 2019; Gómez et al., 2020).

Significant differences were also found regarding the assessment of the suitability of resources for teaching history, taking into account sex and age. The women surveyed value eight of the teaching resources in the classrooms for teaching history more highly than men (heritage, artistic and film productions and documentaries, recreation, festivals and traditions and applications for devices, among others). There are some studies that note significant differences in relation to gender, especially women who show greater skills in mobilizing digital tools than men (Moya et al., 2011; Colmenero and Cózar, 2015; Cabero et al., 2016). In this sense, Cózar and Roblizo (2014) also highlighted that women outperformed men in greater social use of ICT, and Gómez et al. (2020) reports that women have a more favorable attitude than men towards the implementation of digital resources in the classroom. This is in line with the higher scores women in this study give with respect to ICT-related resources.

With respect to age, the greatest differences are found among older teachers, who consider oral sources more appropriate for teaching than younger teachers. In the use of video games, the greatest differences are produced among older teachers who consider them less relevant or adequate than younger ones. Some studies refer in a general way the existence of this digital gap (Torres, 2017; Martín, 2020). In relation to the use of local and regional celebrations and traditions of historical content as a didactic resource, the

significant differences are found among older teachers who consider them more appropriate than those of younger ages.

Elsewhere, the comparison between the teaching staff of Primary and Compulsory Secondary Education reveals that there are significant differences regarding the assessment of some didactic resources. Specifically, with the exception of primary documental sources and artistic productions, the rest of the didactic resources cited in the research are more highly valued for teaching history by primary than secondary teachers. In this regard, there are studies that confirm the predominant use of traditional practices by secondary school teachers (Beltrán et al., 2006; Gómez et al., 2016). Likewise, other research reports that the textbook is the most widely used resource in compulsory secondary education (Gómez et al., 2015; Gómez and Miralles, 2017).

From the above we see that, although teachers are considering the use of less traditional resources, they continue to use more traditional resources and strategies that focus, above all, on the transmission and memorization of information (Oller, 2011; Gómez et al., 2018; Gómez and Sobrino, 2018; Gómez-Carrasco et al., 2020).

Several studies have also shown these dissonances by associating them with change and the desire of teachers to improve their teaching, in addition to the influence of educational policies that point to the relevance of student-centered teaching and the development of competencies (Hernández et al., 2012; Yunga Godoy et al., 2016; Gómez et al., 2018) although more comparative research is needed (König and Blömeke, 2012; Barnes et al., 2017; König et al., 2017).

This has important educational repercussions for the initial training of teachers as it involves analyzing the university training programs that are being carried out and introducing new training models for teachers in which importance is given not only to disciplinary knowledge but also to didactic training related to the teaching disciplines that have received the least attention and to a historical education based on competences (Parra and Fuertes, 2019; Sánchez-Ibáñez et al., 2020).

It is also essential to strengthen the actions for the continuous training of teachers so that teachers can update and innovate their teaching practices through the results of research carried out in the field of social science teaching and in the construction of historical knowledge (Castro-Fernández et al., 2020).

In summary, what is clear is that within the context of history and social science education, in terms of the relationship between teaching approaches and teaching practice, the fact that teachers value resources that are far removed from a traditional teaching methodology based on memorization, the textbook and the teacher's notes indicates that, at least in the teachers' perception at the level of didactic methodology, there is a move towards more student-centered approaches, in which strategies and didactic resources serve to achieve a more comprehensive and critical learning of history.

Data availability

The materials from this research are available on request from the corresponding author.

Received: 10 November 2020; Accepted: 13 January 2021;

Published online: 04 March 2021

References

- Acosta LM (2015) "Role-playing" basado en cine de género histórico y enseñanza de la historia. *Iber* 80:48–56
- Ato M, López JJ, Benavente A (2013) Un sistema de clasificación de los diseños de investigación en psicología. *An Psicol* 29:1038–1059. <https://doi.org/10.6018/analesps.29.3.178511>
- Ayén F (2017) ¿Qué es la gamificación y el ABJ? *Iber* 86:7–15
- Barnes N, Fives H, Dacey C (2017) US teachers' conceptions of the purposes of assessment. *Teach Teacher Educ* 65:107–116. <https://doi.org/10.1016/j.tate.2017.02.017>
- Bartie A, Fleming L, Freeman M, Hulme T, Hutton A, Readman P (2018) 'History taught in the pageant way': education and historical performance in twentieth-century Britain. *Hist Educ* 48:1–24. <https://doi.org/10.1080/0046760X.2018.1516811>
- Bel JC (2017) Picture and History textbooks in Primary Education: a comparative study through a qualitative analysis. *Rev Educ* 377:82–112. <https://doi.org/10.4438/1988-592X-RE-2017-377-354>
- Beltrán J, Martínez N, Souto XM (2006) Los profesores de historia y la enseñanza de la historia en España. Una investigación a partir de los recuerdos de los alumnos. *Enseñ Cienc Soc* 5:55–71
- Bisquerra R, Pérez-Escoda N (2015) ¿Pueden las escalas Likert aumentar en sensibilidad? *Rev Innov Recerca Educ* 8:129–147. <https://doi.org/10.1344/reire2015.8.2.828>
- Bizzio MA, Quiroga RB, Pereira R (2018) Los desafíos de enseñar por competencias. Una reflexión docente. *Aula Secund* 25:25–28
- Blay JM (2015) Dibujando la historia. El cómic como recurso didáctico en clase de Historia. *Supervision* 21(36):1–14
- Cabero J, Barroso J, Llorente MC, Yanes C (2016) Redes sociales y Tecnologías de la Información y la Comunicación en Educación: aprendizaje colaborativo, diferencias de género, edad y preferencias. *Rev Educ Distancia* 51:1–23. <https://doi.org/10.6018/red/51/1>
- Camuñas D, Cambil N (2019) La enseñanza-aprendizaje de la historia a través de los videojuegos. In: Fernández AR, Fernández M, Ravina R, Bayardo L (eds.) *Humanidades y Ciencias Sociales: Interrelaciones con las nuevas tecnologías en la sociedad del conocimiento*. Narcea, Madrid, pp. 135–148
- Carretero M (2019) Pensamiento histórico e historia global como nuevos desafíos para la enseñanza. *Cuadernos Pedagog* 495:59–63
- Castro-Fernández B, Castro-Calviño L, Conde-Miguel J, López-Facal R (2020) Concepciones del profesorado sobre el uso educativo del patrimonio. *Rev Interuniv Form Profr* 95(34.3):77–96. (2020)
- Castro L, López R (2019) Educación patrimonial: necesidades sentidas por el profesorado de infantil, primaria y secundaria. *Rev Interuniv Form Profr* 94(33.1):97–114
- Chaparro A, Felices de la Fuente MM (2019) Perceptions of teachers in initial training about the use of heritage in educational contexts. *Rev Interuniv Form Profr* 94:327–346
- Colmenero MJ, Cózar R (2015) Usos y competencias en TIC en los futuros maestros de Educación Infantil y Primaria: hacia una alfabetización tecnológica real para docentes. *Pixel-Bit* 47:23–39. <https://doi.org/10.12795/pixelbit.2015.47.02>
- Colomer JC, Sáiz J (2019) Problemas para integrar la tecnología digital en la enseñanza de las Ciencias Sociales: un estudio de caso. In: João M, Dias A (eds.) *Enseñar y aprender didáctica de las Ciencias Sociales: La formación del profesorado desde una perspectiva sociocrítica*. Escola Superior de Educação, Lisboa, pp. 319–326
- Colomer JC, Sáiz J, Bel JC (2018) Competencia digital en futuros docentes de Ciencias Sociales en Educación Primaria: análisis desde el modelo TPACK. *Educ Siglo XXI* 36:107–128. <https://doi.org/10.6018/j/324191>
- Corti L, Fielding N, Bishop L (2016) Editorial for special edition, digital representations: re-using and publishing digital qualitative data. *SAGE Open* 6(4). <https://doi.org/10.1177/2158244016678911>
- Cox G, Masuku B, Willmers M (2020) Open textbooks and social justice: open educational practices to address economic, cultural and political injustice at the University of Cape Town. *J Interact Media Educ* 1:2. <https://doi.org/10.5334/jime.556>
- Cózar R, Roblizo M (2014) La competencia digital en la formación de los futuros maestros. Percepciones de los alumnos de los Grados de Maestro de la Facultad de Educación de Albacete. *Rev Latinoam Tecnol Educat* 13:119–133. <https://doi.org/10.17398/1695-288X.13.2.119>
- Cózar-Gutiérrez R, Sáez-López JM (2016) Game-based learning and gamification in initial teacher training in the social sciences: an experiment with MinecraftEdu. *Int J Educ Technol High Educ* 13(2). <https://doi.org/10.1186/s41239-016-0003-4>
- Cuenca JM (2009) El patrimonio en la didáctica de las ciencias sociales: análisis de concepciones, dificultades y obstáculos para su integración en la enseñanza obligatoria. Universidad de Huelva, Huelva
- Cuenca JM, Estepa MM (2011) El patrimonio cultural en la educación reglada. *Patrim Cult Esp* 5:45–58
- Cuenca-López JM, Estepa-Giménez J, Martín-Cáceres MJ (2017) Heritage, education, identity and citizenship. Teachers and textbooks in compulsory education. *Rev Educ* 375:136–159. <https://doi.org/10.4438/1988-592X-RE-2016-375-338>
- Cuenca JM, Martín M (2010) La resolución de problemas en la enseñanza de las Ciencias Sociales a través de los videojuegos. *Rev Íber* 63:32–42
- Delgado EJ (2017) El cómic como recurso educativo en la enseñanza de las ciencias sociales: compromiso socio-histórico y valores en el manga de Tezuka. *Cult Educ* 29:848–862. <https://doi.org/10.1080/11356405.2017.1370819>

- Domínguez J (2015) Pensamiento histórico y evaluación de competencias. Graó, Barcelona
- Egea A, Arias L, Santacana J (2018) Y la arqueología llegó al aula. La cultura material y el método arqueológico para la enseñanza de la historia y el patrimonio. TREA, Gijón
- Estepa J (2019) Investigar para innovar: el caso del Ámbito de Investigación de las sociedades actuales e históricas. *Rev Invest Didact Cien Soc* 1:4–19. <https://doi.org/10.17398/2531-0968.04.4>
- Estepa J, Ávila R, Ferreras M (2008) Primary and secondary teachers' conceptions about heritage and heritage education: a comparative analysis. *Teach Teacher Educ* 26:2095–2107
- Estepa J, García FF (2020) El modelo del en el aula en el proyecto IRES. *Iber* 100:22–28. ISSN: 1133-9810
- Felices-De la Fuente MM, Chaparro-Sainz A, Rodríguez-Pérez RA (2020) Percepciones sobre la utilización del patrimonio para la enseñanza de la historia. Un estudio con profesores de Educación Secundaria en formación. *Humanit Soc Sci Commun* 7(123):1–10. <https://doi.org/10.1057/s41599-020-00619-3>
- Fontal O, Ibáñez A (2017) Presentación. Educación y patrimonio: innovación y reflexión. *Rev Educ* 40:9–12.
- Forrest B, Weldrake D (2018) Utilising archaeological approaches in English primary schools to develop pupils historical skills and understanding. In: Egea A, Arias L, Santacana J (eds.) Y la arqueología llegó al aula. La cultura material y el método arqueológico para la enseñanza de la historia y el patrimonio. TREA, Gijón, pp. 71–86
- García-Martin J, García-Sánchez JN (2017) Pre-service teachers' perceptions of the competence dimensions of digital literacy and of psychological and educational measures. *Comput Educ* 107:54–67
- Gil E, Maccario N, Yanmaz D (2016) Design, implementation and evaluation of innovative science teaching strategies for non-formal learning in a natural history museum. *Res Sci Technol Educ* 34(3):325–341. <https://doi.org/10.1080/02635143.2016.1222360>
- Gómez CJ, Miralles P (2016) Développement et évaluation des compétences historiques dans les manuels scolaires. Une étude comparative France-Spagne. *Spirale* 58:55–66. <https://doi.org/10.3917/spir.058.0053>
- Gómez C, Miralles P (2016) Las competencias históricas en educación obligatoria: evaluación, estrategias basadas en la indagación y argumentación de los estudiantes. *New Approaches Educ Res* 5(2):139–146. <https://doi.org/10.7821/naer.2016.7.172>
- Gómez CJ, Miralles P (2017) Los espejos de Clío. Usos y abusos de la Historia en el ámbito escolar. Silex Ediciones, Madrid
- Gómez CJ, Miralles P, Chapman A (2017a) Los procedimientos de evaluación en la clase de Historia. Un estudio comparativo a través de las opiniones de los docentes en formación de España e Inglaterra. *Rev Electrón Interuniv Form Profr* 20:45–61. <https://doi.org/10.6018/reifop.20.1.284631>
- Gómez CJ, Miralles P, López-Facal R, Prats J (2017b) Las competencias históricas en el horizonte. Propuestas presentes y perspectivas de futuro. In: López Facal R, Miralles P, Prats J, Gómez CJ (eds.) Enseñanza de la historia y competencias educativas. Graó, Barcelona, pp. 215–227
- Gómez CJ, Ortuño J, Miralles P (2018) Enseñar ciencias sociales con métodos activos de aprendizaje. Reflexiones y propuestas a través de la indagación. Octaedro, Barcelona
- Gómez CJ, Rodríguez RA (2014) Aprender a enseñar ciencias sociales con métodos de indagación. Los estudios de caso en la formación del profesorado. *Rev Docencia Univ* 12(2):307–325. <https://doi.org/10.4995/redu.2014.5651>
- Gómez CJ, Rodríguez RA, Miralles P (2015) La enseñanza de la Historia en educación primaria y la construcción de una narrativa nacional. Un estudio sobre exámenes y libros de texto en España. *Perfiles Educ* 37:20–38. <https://doi.org/10.22201/iisue.24486167e.2015.150.53160>
- Gómez CJ, Rodríguez RA, Mirete AB (2016) Relación entre metodología docente y uso de recursos de innovación en la enseñanza de la historia. Un análisis a través de los recuerdos de los maestros en formación. *Clío* 42(ISSN-e):1139–6237
- Gómez CJ, Rodríguez RA, Mirete AB (2018) Perception of teaching history and epistemological conceptions. Research with future teachers. *Rev Complut Educ* 29(1):237–250. <https://doi.org/10.5209/RCED.52233>
- Gómez CJ, Sobrino D (2018) Métodos activos de aprendizaje y adquisición de competencias en la clase de Historia. In: Miralles P, Gómez CJ (eds.) La educación histórica ante el reto de las competencias Métodos, recursos y enfoques de enseñanza. Octaedro, Barcelona, pp. 111–126
- Gómez-Carrasco CJ, Miralles-Martínez P, Fontal O, Ibáñez-Etxeberria A (2020) Cultural heritage and methodological approaches-an analysis through initial training of history teachers (Spain-England). *Sustainability* 12(3):1–21. <https://doi.org/10.3390/su12030933>
- Gómez CJ, Sainz AC, Gutiérrez RC (2020) Estrategias metodológicas y uso de recursos digitales para la enseñanza de la historia: análisis de recuerdos y opiniones del profesorado en formación inicial. *Aula abierta* 49(1):65–74. <https://doi.org/10.17811/rife.49.1.2020.65-74>
- Guil M (2006) Escala mixta Likert-Thurstone. *Andulí* 5:81–95
- Hernández F, Maquilón JJ, Monroy F (2012) Estudio de los enfoques de enseñanza en profesorado de educación primaria. *Profesorado* 16:61–77
- Ibáñez-Etxeberria A, Fontal O, Rivero P (2018) Educación patrimonial y TIC en España: marco normativo, variables estructurales y programas referentes. *Arbor* 194(788):448. <https://doi.org/10.3989/arbor.2018.788n2008>
- Isbell J, Baker JC, Roberts J, Callender A (2018) Opening the secret city: tapping resources from a historic research lab to guide interdisciplinary secondary teaching and learning. *Int J Interdiscipl Educ Stud* 13(4):17–25. <https://doi.org/10.1884/2327-011X/CGP/v13i04/17-25>
- Jiménez R, Cuenca JM (2015) El uso didáctico de los videojuegos. Concepciones e ideas de futuros docentes de Ciencias Sociales. *CLIO* 41:1–44
- Jiménez R, Cuenca JM, Ferreras M (2010) Heritage education: exploring the conceptions of teachers and administrators from the perspective of experimental and social science teaching. *Teach Teacher Educ* 26(6):1319–1331. <https://doi.org/10.1016/j.tate.2010.01.005>
- König J, Blömeke S (2012) Future teachers' general pedagogical knowledge from a comparative perspective: does school experience matter? *ZDM* 44:341–354. <https://doi.org/10.1007/s11858-012-0394-1>
- König J, Litgvoeta R, Klemenza S, Rothland M (2017) Effects of opportunities to learn in teacher preparation on future teachers' general pedagogical knowledge: Analyzing program characteristics and outcomes. *Stud Educ Eval* 53:122–133. <https://doi.org/10.1016/j.stueduc.2017.03.001>
- López-Benito MV, Martínez T, Grevtova I (2015) El m-learning en la didáctica del patrimonio: ¿Tendencias del nuevo milenio? *Iber* 80:38–47
- López-Roldán P, Fachelli S (2015) Metodología de la investigación social cuantitativa. Universitat Autònoma de Barcelona, Barcelona
- Lucas L, Delgado-Algarra EJ (2020) The postmodern teacher of social sciences: a model of good practices in heritage education. *Rev Iberoam Sobre Calid Efic Cambio Educ* 18(1):27–45. <https://doi.org/10.15366/reice2020.18.1.002>
- Matas A (2018) Diseño del formato de escalas tipo Likert: un estado de la cuestión. *Rev Electrón Invest Educ* 20(1):38–47. <https://doi.org/10.24320/redie.2018.20.1.1347>
- Martín AM (2020) La brecha digital generacional. *Temas Laborales* 151:77–93
- Miguel-Revilla D, Martínez-Ferreira JM, Sánchez-Agustí M (2020) Assessing the digital competence of educators in social studies: an analysis in initial teacher training using the TPACK-21 model. *Australas J Educ Technol* 36(2):1–12. <https://doi.org/10.14742/ajet.5281>
- Mira A, Sáiz J (2020) El docente investigador en las aulas de la enseñanza básica. El modelo Gea-Clío. *Iber* 100:47–52
- Miralles P, Gómez CJ, Arias VB, Fontal O (2019) Digital resources and didactic methodology in the initial training of History teachers. *Comunicar* 61:45–56. <https://doi.org/10.3916/C61-2019-04>
- Miralles P, Gómez CJ, Monteagudo J (2019) Percepciones sobre el uso de recursos TIC y “mass-media” para la enseñanza de la historia. Un estudio comparativo en futuros docentes de España-Inglaterra. *Educación XXI*, 22(2):187–211
- Miralles P, Gómez CJ, Rodríguez RA (2017) Patrimonio, competencias históricas y metodologías activas de aprendizaje. Un análisis de las opiniones de los docentes en formación en España e Inglaterra. *Estud Pedagóg* 4:161–184. <https://doi.org/10.4067/S0718-07052017000400009>
- Molina S, Alfaro A (2019) Ventajas e inconvenientes del uso del libro de texto en las aulas de Educación Primaria. Percepciones y experiencias de docentes de la Región de Murcia. *Rev Electrón Interuniv Form Profr* 22(2):179–197. <https://doi.org/10.6018/reifop.22.2.332021>
- Molina S, Muñoz R (2016) La opinión del profesorado de Educación Secundaria sobre el papel del patrimonio en la enseñanza formal de las ciencias sociales: un estudio de caso. *Rev Complut Educ* 27(2):863–880. https://doi.org/10.5209/rev_RCED.2016.v27.n2.48411
- Monroy F, González-Gerardo J, Hernández-Pina F (2015) A psychometric analysis of the Approaches to Teaching Inventory (ATI) and a proposal for a Spanish version (S-ATI-20). *An Psicol* 31:172–183. <https://doi.org/10.6018/analesps.31.1.190261>
- Moya M, Hernández JR, Hernández JA, Cózar R (2011) Análisis de los estilos de aprendizaje y las TIC en la formación personal del alumnado universitario a través del cuestionario. *Rev Invest Educ* 29(1), 137–156
- Muthén LK, Muthén BO (2015) Mplus User's Guide. Muthén & Muthén, Los Ángeles, Estados Unidos
- Namakforoosh MN (2005) Metodología de la investigación. Limusa, México City
- Oller M (2011) Métodos y estrategias para la enseñanza y el aprendizaje de las Ciencias Sociales. In: Santisteban A, Pagés J (eds.) Síntesis Didáctica del Conocimiento del Medio Social y Cultural en la Educación Primaria. Madrid, pp. 163–183
- Orts M (2019) El uso de móviles en el instituto. Reflexiones en el instituto Jaume Vicens Vives (Girona). *Aula Secund* 32:35–39
- Pei-Fen S (2020) Historical consciousness matters: national identity, historical thinking and the struggle for a democratic education in Taiwan. *J Curric Stud* 52(5):685–701. <https://doi.org/10.1080/00220272.2020.1789225>
- Parra D, Fuertes C (Coords.) (2019) Reinterpretar la tradición, transformar las prácticas. Ciencias Sociales para una educación crítica. Tirant humanidades, Valencia

- Prats E (2016) La formación inicial docente entre profesionalismo y vías alternativas: mirada internacional. *Bordón* 68:9–33. <https://doi.org/10.13042/Bordón.2016.68202>
- Quintero DL (2018) Didáctica de las Ciencias Sociales a través de los videojuegos: Investigación y experimentación del juego *Assassin's Creed Origins*, para posible propuesta didáctica sobre la enseñanza del patrimonio y la cultura del Antiguo Egipto. *CLIO* 44:54–81
- Ramírez A, González N (2016) Media competence of teachers and students of compulsory education in Spain. *Comunicar* 49:49–58. <https://doi.org/10.3916/C49-2016-05>
- Rivero P, Feliu M (2017) Aplicaciones de la arqueología virtual para la Educación Patrimonial: análisis de tendencias e investigaciones. *Estud Pedagog* 43:319–330. <https://doi.org/10.4067/S0718-07052017000400017>
- Rodríguez MA, Ruiz DG (2016) Innovación en el aula de Ciencias Sociales mediante el uso de videojuegos. *Rev Iberoam Educ* 72(2):181–200. <https://doi.org/10.35362/rie722107>
- Sáez I, Molina J, Barriga E (2017) La enseñanza y aprendizaje de las ciencias sociales y el desarrollo de la competencia social y ciudadana. In: López R, Miralles P, Prats J, Gómez CJ (eds.) *Enseñanza de la historia y competencias educativas*. Graó, Barcelona
- Sáiz J (2011) Actividades de libros de texto de Historia, competencias básicas y destrezas cognitivas, una difícil relación: análisis de manuales 1º y 2º de ESO. *Didáct Cienc Exp Soc* 25:37–64
- Sáiz J, Fuster C (2014) Memorizar historia sin aprender pensamiento histórico: las PAU de Historia de España. *Rev Investig Escuela* 84:47–57. ISSN: 0213-7771
- Sáiz J, López-Facal R (2015) Competencias y narrativas históricas: el pensamiento histórico de estudiantes y futuros profesores españoles de educación secundaria. *Rev Estud Soc* 52:87–101. <https://doi.org/10.7440/res52.2015.06>
- Sánchez-Ibáñez R, Campillo-Ferrer JM, Guerrero-Romera C (2020) Percepciones del profesorado de primaria y secundaria sobre la enseñanza de la historia. *Rev Interuniv Form Profr* 95(34.3):57–76
- San Martín A, Ortega-Sánchez D (2020) Empathy, historical empathy and pre-historic empathy: a conceptual approach from Social Sciences teaching. *Didáct Cienc Exp Soc* 38:3–16. <https://doi.org/10.7203/DCES.38.15648>
- Santacana, J. (2012). La historia fuera del aula. *Didáctica del Patromoni Cultural* [Blog]. Retrieved August 21, from <https://cutt.ly/cfVyffj>
- Santacana J, Lluch N (2015) El patrimonio cultural inmaterial y su didáctica. Trea, Gijón.
- Sapsford R, Jupp V (2006) *Data Collection and Analysis*. Sage and The Open University, London
- Seixas P (1993) The community of inquiry as a basis for knowledge and learning: the case of history. *Am Educ Res J* 30:305–324. <https://doi.org/10.3102/00028312030002305>
- Seixas P, Morton T (2013) *The Big six historical concepts*. Nelson College Indigenous, Toronto, Estados Unidos
- Strapek F (2019) Comparative analysis of the secondary school history textbooks of the V4 countries—an overview of genocides in the history of the 20th century. *Czech-Pol Hist Pedag J* 11(1):120–136. <https://doi.org/10.5817/cphpj-2019-015>
- Torres C (2017) Sociedad de la información y brecha digital en España. *Panor Soc* 25:17–33
- Trigwell K, Prosser M (2004) Development and use of the approaches to teaching inventory. *Educ Psychol Rev* 16:409–424. <https://doi.org/10.1007/s10648-004-0007-9>
- Trigwell K, Prosser M, Ginns P (2005) Phenomenographic pedagogy and a revised approaches to teaching inventory. *High Educ Res Dev* 24(4):349–360. <https://doi.org/10.1080/07294360500284730>
- Trujillo F (2017) Del juego a la gamificación. *Aula Innov Educat* 267:38–40
- Valls R (1999) De los manuales de historia a la historia de la disciplina escolar: nuevos enfoques en los estudios sobre la historiografía escolar española. *Dialnet* 18:169–190
- Valls R, López-Facal R (2011) ¿Un nuevo paradigma para la enseñanza de la historia? Los problemas reales y las polémicas interesadas al respecto en España y en el contexto del mundo occidental. *Enseñ Cienc Soc* 10:75–85
- VanSledright BA, Reddy K (2014) Changing epistemic beliefs? An exploratory study of cognition among prospective history teachers. *Rev Tempo Argum* 6 (11):28–68. <https://doi.org/10.5965/2175180306112014028>
- Verdú D, Guerrero C, Villa JL (2018) Pensamiento histórico y competencias sociales y cívicas en Ciencias Sociales. Editum, Murcia
- Vicent N, Rivero P, Feliu M (2015) Arqueología y tecnologías digitales en Educación Patrimonial. *Educ Siglo XXI* 33(1):83–102. <https://doi.org/10.6018/j/222511>
- Wineburg SS (1991) Historical problem solving: a study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *J Educ Psychol* 83(1):73–87. <https://doi.org/10.1037/0022-0663.83.1.73>
- Yunga Godoy DC, Loaiza MI, Ramón Jaramillo LN, Bravo I (2016) Enfoques de la Enseñanza en Educación Universitaria: Una exploración desde la perspectiva Latinoamericana. *Profesorado* 20(3):313–333

Acknowledgements

This project was carried out through the funding of two ongoing projects and to whose teams the authors belong. The first entitled “Methodological concepts and active learning methods for the improvement of teaching skills of teachers (PGC2018-094491-B-C33) (MCI/AEI/FEDER, UE),” is funded by the Ministry of Science and Innovation, the Spanish Research Agency and the EU’s European Regional Development Fund, directed by Pedro Miralles Martínez and Cosme Jesús Gómez Carrasco. The second is funded by the Seneca Foundation for Science and Technology in the Region of Murcia and is entitled “Geographic and historical thinking of primary school students in the Region of Murcia: an innovative methodological proposal for quality education (20874/PI/18”, under the direction of Pedro Miralles Martínez (University of Murcia)”

Competing interests

The authors declare no competing interests.

Additional information

Correspondence and requests for materials should be addressed to C.G.-R.

Reprints and permission information is available at <http://www.nature.com/reprints>

Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third party material in this article are included in the article’s Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the article’s Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

© The Author(s) 2021, corrected publication 2021