The potential of ICT tools for teaching cultural heritage: a study with secondary school teachers

Jacob Vargas-Arteaga†, Marbel Gravini-Donado†, Myriam Ortíz-Padilla† & Isabel Sierra-Pineda‡

Simón Bolívar University, Barranquilla, Colombia†
University of Córdoba, Montería, Colombia‡

ABSTRACT: In this article, the authors present a study in relation to the use of technological resources in cultural heritage teaching in high schools selected from a northern city in Columbia. A mixed research design was employed combining techniques from descriptive statistics and content analysis. Data were collected through a survey with open and closed multiple-choice questions that was administered to 43 social science teachers from urban and rural schools in the selected city. Results indicate that despite the limited introduction and use of ICT tools in heritage teaching, teachers recognise the potential of these technologies in the preservation and dissemination of heritage in educational scenarios. The study offers a starting point to the development of technology-oriented proposals that would ultimately contribute to a better understanding and utilisation of ICT tools in teaching cultural heritage, and thus improve the educational outcomes.

INTRODUCTION

The growing impact of information and communication technologies (ICT) in various areas of human life has included teaching, and the conservation of cultural heritage in its various manifestations, which is evident in the integration of these technologies in heritage learning, realising the potential that ICT tools offer in the educational field [1]. However, the challenge of further examining these tools contribution to the social appropriation of cultural heritage still remains current [1][2].

It may be said that the massification of ICT and the role it plays today in training processes derives from a technological revolution focused on the adoption of ICT tools and their application for knowledge management [3]. As a result, it is pertinent to continue investigating the role given to these resources in the processes of teaching and the preservation of cultural heritage. From this perspective, a study is presented in this article, which sought to determine the technological resources made available to teachers and the way in which they are included in the teaching processes of cultural heritage. The results of this study can contribute to the development of educational projects oriented towards the didactics and teaching of heritage assets through strategies supported by digital technologies.

Teaching of Cultural Heritage with ICT Tools

As in other areas of human life, ICT incursion into educational scenarios has demanded the transformation of teaching practices and a greater appreciation and utilisation of these resources by teachers. In Bauman's words, the demands of today's society make such transformation necessary and urgent, since nowadays it is not enough to transmit knowledge, but it is necessary to teach how to develop new and better capacities and develop them in dynamic and ever-changing times [4]. In this sense, the challenge consists in the construction of teaching models that integrate technological resources to take advantage of their potential in the design of innovative scenarios for teaching and communication [5], since it is evident that with technologies the creation of meaningful spaces for teaching and learning is far more efficient and can lead to better outcomes [6]. Today, teachers have a variety of technological resources to work with.

However, the introduction of these innovations is still focused on the transmission of information and its incorporation from a technical and utilitarian perspective that is often accompanied by traditional training methods. This traditional way of adopting ICT is also evident in heritage teaching [7]. But in recent years proposals have been developed in which digital technologies have become a valuable tool in heritage teaching, which is evident in the efforts to incorporate ICT in the contents, competencies and didactics of heritage [8]. Similarly, other research studies indicate that digital technologies can become tools for promotion and preservation of heritage [9][10] acting as platforms for interaction which can lead to the dissemination and social appropriation of all types of heritage expressions [11][12].

Likewise, the growing number of studies related to the ICT integration into heritage teaching [1] represents an example of the efforts made in schools to develop innovative strategies that facilitate the understanding of cultural heritage in a more comprehensive and dynamic way.

In this regard, a previous study has pointed out that the integration of technological resources in heritage teaching enables the creation of innovative scenarios for motivation and exchange of experiences, where students can establish links with cultural heritage [13]. Thus, in the field of heritage teaching, trends stand out that point to the integration of virtual reality, augmented reality, digital narratives, gamification, video games and m-learning, as shown in Figure 1 [2].

VR, AR, 3D modelling, QR code
Enriched environments
Access to information on heritage sites
Long-term heritage preservation

E-learning/M-learning
Models supported in virtual environments
Autonomy, self-regulation and self-management
Evaluating user experience (UX)

Technologies in
the social
appropriation of
cultural heritage

Gamification
Emerging trends
Challenge-based learning
Mechanics and dynamics

Digital storytelling
Motivating and encouraging creativity
New forms of interaction and cooperation
Social appropriation of artistic and cultural expressions

Figure 1: The teaching of cultural heritage with ICT tools (source: J. Vargas-Arteaga and L. Zanello-Riva [2]).

However, it is necessary to investigate the role played by these resources in teaching practices, mainly in relation to the didactics of cultural heritage in the context of high schools.

METHOD

The study assumed a mixed research design [14] combining techniques from descriptive statistics and content analysis [15]. The nature of the data required a simultaneous analysis from quantitative and qualitative perspectives to address the phenomenon studied with greater rigor and considering the principle of complementarity of the two approaches [16].

The sample consisted of 43 social science teachers from high schools with a similar proportion of men (48.8%; n = 21) and women (51.2%; n = 22). Most of the participants were born locally (72.1%; n = 31) and work in 22 public schools in the municipality of Santa Cruz de Lorica in Colombia. All participants were informed about the objective of the study and the confidential manner in which their personal data would be treated.

A questionnaire with 24 open and closed multiple-choice questions was applied and validated by nine experts from two Mexican and four Colombian universities. The instrument was divided into three sections: the first to collect sociodemographic information, the second section with items that inquire about the representations that teachers have about their cultural heritage, and the third with questions about the potential use of ICT in cultural heritage teaching. The data analysis was focused on four items in the last section from this questionnaire (Table 1).

At the quantitative level, items with closed responses (items 18 and 24) were considered to which answers were organised in a Microsoft Excel 2016 spreadsheet and analysed in the statistical package IBM SPSS version 27. At the qualitative level, items with open responses (items 16 and 22) were considered for which data were collected and analysed in the program MaxdaQDA 2020, using word frequencies and coding techniques [17] to make inferences to interpret the teachers' opinions through content analysis [15].

Table 1: Items selected for analysis in the study.

		Type response
Item 16	What types of activities, strategies or resources do you currently use in teaching cultural heritage?	Open
Item 18	Indicate what type of strategies, activities or resources are used in your school for the teaching of the cultural heritage of Santa Cruz de Lorica.	Multiple choice
Item 22	What opportunities or benefits do you see in the use of technology for heritage teaching in the municipality's schools?	Open
Item 24	Point out one or several technological tools that could be useful for the approach and teaching of cultural heritage.	Multiple choice

RESULTS

The coding process resulted in the appearance of codes derived from teachers' views and perceptions that confirmed the categories that could be associated at a theoretical level with the construct studied, in this case the approach to teach cultural heritage with technology. The frequency value of each occurrence of text fragments related to the codes is presented in parentheses for each of the codes.

The opinion of teachers in regard to item 16 resulted in the appearance of four codes related to two categories that could account for the resources used by teachers to teach cultural heritage. The first category of this section is called traditional resources, where two codes are located: the first code *didactic material* (15) which is associated with fragments such as *posters, photographs are used*; for example, *basically I use workshops, photocopied material, work guides*; and the second code *consultation activities* (11) which is related to the activities or tasks that teachers assign on aspects related to heritage; for example, *research, consultations and activities are done to inquire about the assets and culture*.

A second category that emerges in the analysis of this item is experiential learning, which is composed of two codes. In the code called *fieldtrips* (13), aspects related to field trips and visits to emblematic places that teachers develop with students stand out, as can be seen in the following quotes: *we make tours to historical monuments*, *trips to the historical centre where the student knows the outstanding places*, *field work is important for the student to know the places of interest*. The other code associated with this category is *active experimentation* (9), as cited in these paragraphs: *direct observation of the student at the sites is applied*, *field work makes new experiences possible*, *visits to important sites promote inquiry and learning*, *some pedagogical projects are developed at important sites and places*.

Regarding the strategies and resources used by teachers in heritage teaching, the results of item 18 show that teachers mostly use field trips (22%), followed by books (21%), work guides (16%), videos (15%) and models (12%). Simulators, applications or software are not used to a great extent (5% and 4%, respectively). Four percent of the teachers stated that they do not use any type of resource to approach cultural heritage in their classes (Figure 2).
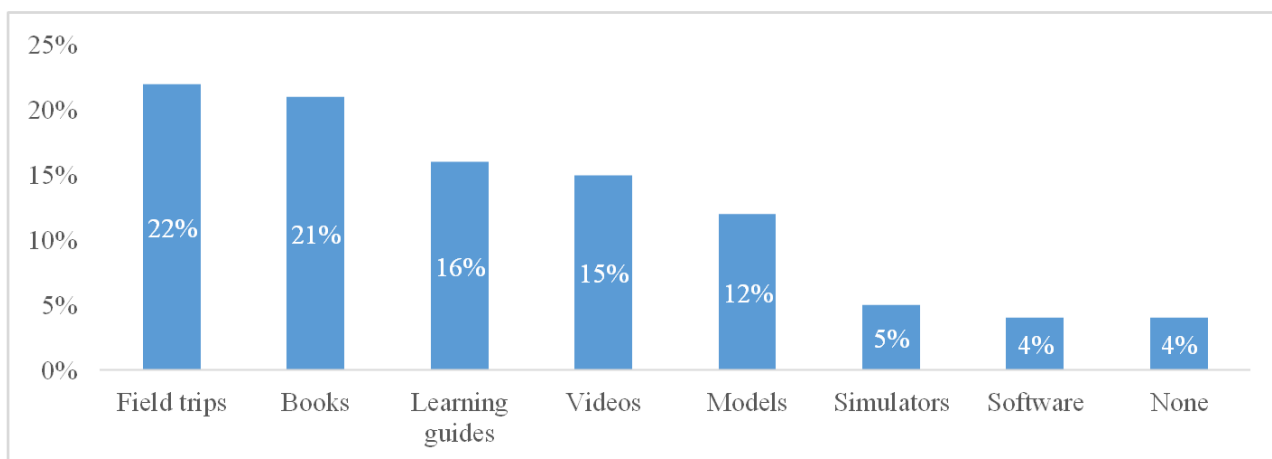

Figure 2: Resources used by teachers for teaching cultural heritage.

In relation to item 22, the analysis of the teachers' opinion yields three codes that, due to the number of citations and the lack of derived codes, are emerging categories. Thus, the category *promotion* (11) is associated with the potential that technological resources can have for the promotion and dissemination of cultural heritage; here it is highlighted; for example, *these tools can help to make our culture known*, *with the help of these resources we can promote the creation of companies around heritage*, *with the help of technology we can make heritage known and strengthen our economy with tourism*.

In the *preservation* (15) category, there are relevant aspects related to the importance of technology as an instrument for the preservation of cultural heritage; here are some relevant phrases: *a great tool that enhances and helps to improve the value, academia, culture and historical memory*, *helps students to make contributions that enhance their knowledge and learning of cultural heritage*, *contribute in schools and throughout the municipality to safeguard heritage*.

Another category that emerges in the analysis is *motivation* (13); here teachers point out that technological resources are a tool that can energise learning and motivate young people, as suggested by some quotes: *technology can be a great ally at this time*, *these tools motivate the youngest*, *the first benefit is motivation*, and *these resources offer pleasant, dynamic and interesting environments*.

Finally, in relation to the potential use of ICT resources in the teaching of cultural heritage, in item 24, the opinion of teachers is mostly in favour of the use of Web pages or blogs (25%), followed by video games (14%), social networks

(14%), virtual or augmented reality (13%), interactive maps (12%), massive on-line courses (MOOCs) (12%) and finally mobile applications (11%). Although many teachers favour the use of Web pages or blogs, the other options present very similar results (Figure 3).
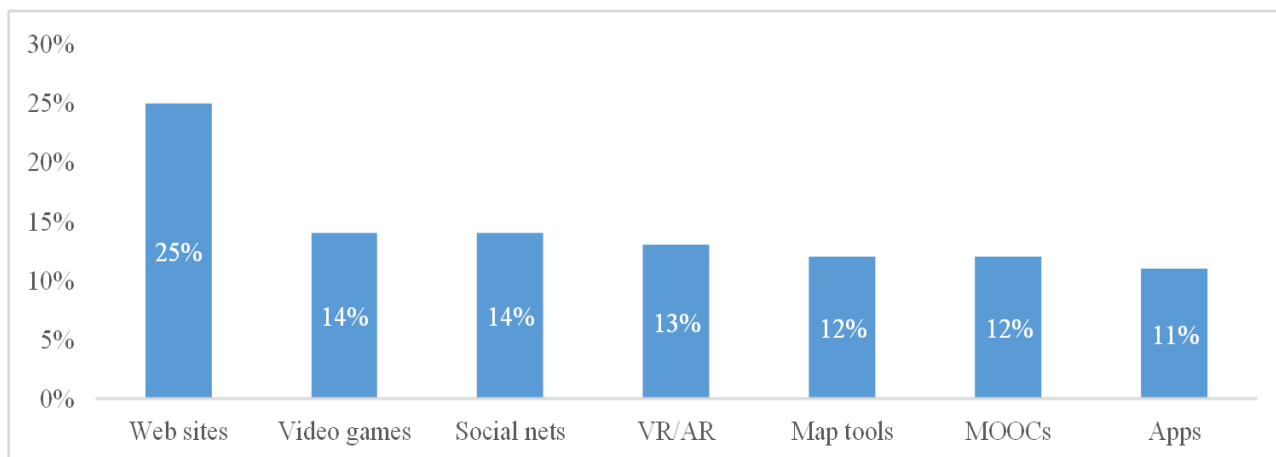

Figure 3: ICT resources potentially usable for heritage teaching.

DISCUSSION

The analysis of items 16, 18, 22 and 24 allowed to identify the use of technological resources by social science teachers and the way in which they are included in the processes of teaching cultural heritage. Accordingly, five emerging categories derived from the teachers' opinions are evident (Figure 4).

Figure 4: Emerging categories from the opinion of teachers in relation to heritage teaching using ICTs.

Specifically, the findings derived from the analysis of item 16 point to two emerging categories called *traditional resources* and *experiential learning*. First, it is evident that teachers use traditional elements for teaching cultural heritage in their municipality, where resources such as textbooks or work guides prevail, so it could be said that heritage is approached in an anecdotal and superficial way as mentioned by Cuenca et al [18]. This supports the idea that since there is a limited and traditional vision of heritage, the form of its teaching would be utilitarian and focused on the academic knowledge of heritage assets, leaving aside the relational nature of heritage.

In contrast, the findings that stand out in the experiential learning category show that there is a growing interest among teachers to include tours, field trips and experiential and situated learning as a strategy to approach the knowledge of cultural heritage. Although this is an encouraging scenario, when analysing in detail the fragments of the teachers' discourse, it is evident that a few of them develop this type of activities, and some even admit that they do not use any type of resources to teach cultural heritage.

The general analysis of the discourse suggests that this type of didactic itineraries focus on the knowledge of architectural components or monuments, leaving aside the explanation and interpretation of heritage by students. However, it is interesting to investigate in depth the intentionality of developing this type of experiences, since they allow to tighten links between students and their heritage assets to bring them closer to the knowledge of their local history [19].

On the other hand, the analysis of item 18 shows that some teachers do not use technological resources in heritage teaching (Figure 2). The use of videos, applications and simulators is evidenced, without being a significant percentage, which indicates the low appropriation of digital technologies in heritage teaching. In addition, it is possible to infer that the use of these resources is developed from an instrumental approach, coinciding with that stated by Ibáñez-Etxeberria et al [7], since the use of technological resources as traditional means of transmitting information is evident. This is striking since nowadays there are many technological tools that can be adapted for heritage teaching; unlike in the study by Ortega-Sánchez and Gómez-Trigueros, in this group of teachers there is no evidence of greater efforts to introduce with relevance such innovations to transform the traditional teaching of cultural heritage [8]. However, in item 22, teachers point out the enormous potential of digital technologies in heritage teaching. In this regard, the analysis of this item reveals three emerging categories: *promotion, preservation and motivation*.

The promotion category refers to the potential use of technological resources in the promotion of cultural heritage, since the wide variety of existing resources can strengthen ties between people and heritage. Likewise, with respect to the preservation of cultural heritage, the analysis indicates that technology can be a valuable tool to generate social commitment in favour of the conservation of heritage assets. Regarding the motivation that technological tools can generate, teachers emphasise that they are valuable elements for innovation and improvement of learning environments where students can feel motivated and interact with others through various platforms, giving rise to dynamic spaces for learning about cultural heritage.

In this regard, the findings derived from the results of item 24 show that teachers are aware of the existence of different types of technological tools, but are mostly inclined to use classic and less dynamic resources, such as Web pages or blogs (Figure 3). It is evident that, to a lesser extent, teachers see little feasibility in using other technological resources that can offer greater advantages when developing innovative learning environments, such as video games, social networks, virtual or augmented reality, interactive maps, MOOCs and mobile applications. In this regard, it could be said that this appreciation is due to the lack of knowledge in the use, design and management of content related to these tools, which would be regrettable since this differs from the trends that today demarcate the transcendental role that technological resources have been demonstrating in the teaching of cultural heritage as has been pointed out in previously published studies [1][13].

CONCLUSIONS

Teaching heritage plays a key role in the recognition of the culture and identity of social groups. Hence, the importance of the role played by teachers, since the resources and strategies used for the educational approach to cultural heritage will have an impact on the success of the processes aimed at developing critical and reflective attitudes in students about heritage assets that actively involve them in their social and cultural environment.

As for the teachers, it is evident that they consider the contribution of technologies important, as well as recognise their potential to broaden the contact and interaction of people with heritage. They view ICT as mediations, not only for the situated learning of students in their localities through the understanding of the various manifestations that are part of the cultural heritage, but also for fostering awareness, and thus increasing the concern or interest from the recognition of the value of heritage to a path of promotion and active communication to protect and preserve the cultural legacy.

In contrast, although teachers recognise the great potential of ICT in the teaching of cultural heritage, the findings show that they have little appropriation of these tools. This suggests the almost null use of technological resources in the approach to heritage by teachers, despite the fact that they are aware of the benefits that technologies offer in terms of motivation, interaction and generation of new forms of experiential learning, where students can approach knowledge and develop processes of understanding and establish closer links with their heritage.

Finally, this study offers valuable elements that invite to consider the appropriation and use of ICT in the teaching of cultural heritage to contribute to the design of proposals that not only focus on tangible assets, but also on the relationships that people have with the different manifestations of tangible and intangible cultural heritage. It is necessary to take advantage of the potential provided by digital technologies in heritage teaching, generating enriched learning scenarios that allow to continue contributing to the formation of critical citizens committed to the preservation and sustainability of their cultural heritage.

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