Designing Heritage Itineraries in Trainee Teachers Through Virtual Inter-University and Collaboration Groups: The Examples of Barcelona and La Laguna in Social Sciences Teaching

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In the following paper, we present some general results of an innovative teaching experience carried out by the University of La Laguna (ULL) and the University of Barcelona (UB). The project took place during a 6-week period by applying for cooperative work among early childhood ($n = 109$) and primary ($n = 86$) education trainee teachers in a selected virtual environment (ULL). One of the key aspects was the inter-university student's grouping among both bachelor programs (early childhood and primary). The project had two main aims, which are as follows: (1) to familiarize students with heritage itineraries as key tools for the teaching of Social Sciences and (2) to develop professional competencies related to the coordination of teachers among educational levels, teaching, and learning strategies when using historical heritage and improving digital competencies. To achieve these aims, a three-phase intervention was designed (planning, design, and evaluation), all including active learning and the use of local environments as a teaching resource. To investigate the outcomes of the project, two sources of data were analyzed, namely, the results of a rubric and an opinion questionnaire (Cronbach's $\alpha = 0.693$), applied pre- ($n = 185$), and post- ($n = 152$) intervention. The descriptive statistical analysis was carried out with the Statistical Package for the Social Sciences (SPSS; v. 22) showing the positive learning outcomes of the participants. The rubric's results showed that collaborative work and skills development scored higher, while contents of Social Sciences and the handling of heritage itineraries as teaching strategies were correct but lower than the other parameters analyzed. The questionnaire showed a positive perception of working together in consecutive educational levels and of the uses of digital technology for collaborative work but also indicated some difficulties regarding group organization, especially in the first weeks. The main results of the project highlight several aspects.

(1) The need to apply pedagogical, technological, and educational resources to promote active and meaningful learning in future teachers. (2) The need to use virtual environments as learning and communication spaces in inter-university contexts, and (3) the importance of using local environments as scenarios for teaching Social Sciences.

Keywords: heritage itineraries, interuniversity groups, cooperative learning, social sciences teaching, teaching methodologies

INTRODUCTION

In recent years, in the Spanish university context and in the field of educational innovation, student-centered teaching practices have been developed aiming at overcoming the masterclass-based model and encouraging active student participation. With this purpose, the University of La Laguna (ULL) created the Student-Centered Teaching Model Universidad de La Laguna [ULL] (2021) and the University of Barcelona (UB) Universidad de Barcelona [UB] (2021) its training model, both prioritizing active learning methodologies and a competency-focused pedagogy. This approach follows the 2015 Standards and Guidelines for Quality Assurance in the European Higher Education and, in particular, its criteria on student-centered teaching, learning, and assessment, whereby Universities are encouraged to:

> "Ensure that teaching programs encourage students to be actively involved in creating their own learning process, and students' assessment reflects the student-centered approach" (European Association for Quality Assurance in Higher Education [ENQA], 2015).[1]

Therefore, at the ULL and the UB, the design of the learning processes aimed at allowing students to participate in a global world, by using information and communication technologies (ICTs), thus following the principles of internationalization and borderless education. Within this framework, the main objective of this paper was to offer and discuss the learning outcomes of an innovative and educational transference project carried out in the areas of Didactics of Social Sciences at the ULL and UB during the 2020–2021 academic year. Specifically, the project aimed at developing a heritage itinerary for students from the cities of La Laguna and Barcelona in their transition from pre-school to primary school and the development of digital competencies. In addition, the result consolidated an inter-university working initiative, first carried out between ULL with the University of Huelva (Spain) and the Autonomous University of Baja California (Mexico) during the academic year 2019–2020.

The current project pursued active learning in students outside of the conventional classroom context. The project involved students from the degrees of early childhood and primary school teacher training from Barcelona (Catalonia) and La Laguna (Canary Islands) and applied cooperative work in virtual environments in both universities.

Within the framework of the Spanish university educational context and the trends developed in recent years in the field of innovation (Red de Investigación e Innovación Educativa [REDINE] (ed.), 2020; Sánchez-Rivas et al., 2020; Ballesteros-Alarcón, 2021; Buzón-García et al., 2021; Guarro-Pallás et al., 2021), one of the main innovations incorporated in the project lies in the inter-university and inter-cycle work. Thus, the project involved mixed groups formed by students of the early childhood and primary teacher training courses from both universities.

The project encouraged students to work and become familiar with a key educational tool in heritage education, namely, the didactic itinerary, which enables both the teaching of history and the development of the skills needed to build critical thinking (Estepa-Giménez and Delgado-Algarra, 2021). Heritage education in both formal and non-formal environments promotes the development of critical citizenship, the approach to relevant social problems, and aspects related to identity configuration and heritage identification (Gómez, 2014; Almansa and Facal, 2015; Molina et al., 2015; Cuenca et al., 2017; Callarisa-Mas and Sabido-Codina, 2020). Another fundamental aspect of this project was the development of specific competencies related to teaching coordination, teaching, and learning strategies in formal education and the digital competencies of future teachers.

In this sense, the project implemented teaching and learning methodologies focused on students' participation and active learning in order to improve their academic performance, by designing heritage itineraries while improving the didactic uses of new technologies. In the current educational context, it is mandatory to put into practice educational, pedagogical, and technological resources to make active learning possible for students. This is one of the main challenges for university teaching (Peris-Ortiz et al., 2016), for educational areas in general, and for specific didactics in particular, due to their key role in training school teachers (Constanza-Méndez and Patricia-López, 2020). Therefore, in Social Sciences didactics, working in cooperative learning groups, using contextual didactics, and promoting the analysis of students' immediate heritage can play a key role in training processes of the future teachers by including the environment as a significant learning resource (Muñoz-Villarabiz and Ruiz-Morales, 2020).

THEORETICAL FRAMEWORK

Cooperative learning groups are effective when students work together to achieve common goals. By using strategies, which promote cooperation, participation, and student's interaction and problem solving (Quinquer, 2004; Tran, 2019; Liu and Lipowski, 2021), it is possible to approach current professional teaching training contexts from an academic environment. From this

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[1]Original text in Spanish, translated by the authors.

perspective, cooperative learning is not only a strategy or a methodology but also a learning content (Pujolás, 2008), essential in current teacher training.

As Johnson and Johnson (2019) pointed out, in cooperative learning environments students have two interdependent responsibilities, which are to complete the assigned work and to make sure that the rest of the members also do so. Thus, in this project, cooperative learning groups were the driving force in the development of professional competencies. Each group interacted with students from their counterpart university and educational level in virtual collaborative environments. Moreover, in order to design the heritage itinerary, students came into contact with immediate environments in their own real contexts (the cities of La Laguna and Barcelona) from a teaching perspective.

In this sense, a contextual didactic learning model was applied, which was based on the principle of learning by doing first put forwards by Dewey (1938) in his book *Education and Experience* (Guevara-Bustamante and Moreno-Muro, 2021). This type of learning is part of what Dewey defined as the "experienced theory," developed later by Kolb in the 1980s as "experiential learning theory." It incorporated the contributions of other authors, such as Piaget or Ausubel, who played an important role in experience their respective learning theories (Rodríguez-Palmero, 2011; Albort-Morant et al., 2017). Experiential learning in the classroom allows knowledge to be transferred to real-life situations and enables certain teaching practices to advocate students' contact with their surrounding context (King, 2012). The benefits of such learning are that students enjoy putting into practice what they learn in class, increasing their retention and engagement, and addressing social and historical phenomena within their immediate environment (Chapman et al., 2016). Hence, its uses go beyond early childhood and primary education. Universities, aware of the benefits of including contextual learning, have incorporated experiential learning into their curricula as a complement to more traditional lecture-based learning (Albort-Morant et al., 2017).

The development of heritage itineraries from a contextual didactics approach allows working with local history as a resource with many possibilities in the teaching of Social Sciences. As López-Serrano and Guerrero-Elecalde (2021) pointed out, when working with local history, students perceive that heritage assets are fundamental sources for understanding and learning history. At the same time, students can be initiated into historical interpretation and, above all, "it will encourage curiosity for the historical exploration of the environment, activating interest in the Social Sciences and their construction[2]" (López-Serrano and Guerrero-Elecalde, 2021, p. 3). In consequence, local history allows students to relate immediate contexts and phenomena to global and more general ones.

The contextual didactic perspective based on the treatment of the heritage of the immediate environment allows educational contents to be adapted to real-world situations, which is a central focus of today's teaching. Didactic itineraries, understood as a series of landmarks to be visited, offer unlimited possibilities

in terms of programming educational activities (Maynard and Waters, 2007; Coma and Santacana, 2010) and play an important role in the context of heritage education, especially in the stages of early childhood and primary education.

By addressing local context (neighborhood, surrounding areas) and family context (customs, festivities), it is possible to work with heritage in its tangible and intangible dimensions (Rivero-Gracia, 2011). In this sense, the project trained future teachers in working with heritage in a critical moment, the transition from early childhood education to primary education (Azorín-Abellán, 2019). Designing the itinerary forced students to observe, to make contact with their surrounding reality and immediate context, and to understand the itineraries' educational and didactic potential, especially within coordination between levels. Thus, the project considered the need to foster research skills in order to prepare a guided visit to a heritage environment. In this case, two World Heritage cities were studied, namely, La Laguna and Barcelona.

In other words, the project took into consideration what Albort-Morant et al. (2017) proposed: "that in active learning activities students participate and reflect that experience, at the same time they understand it and then apply their learning."

For the development of the project, some of the dimensions proposed by Barriga-Ubed and Sabido-Codina (2020) were taken into account. Although they had been conceived for the specific case of Historical memory, the high presence of identity contained within led to their consideration for the proposal. The specific elements included are the following:

(1) Selective dimension (scientific method): the didactic practice considers the exploration of cities from the historical research of both World Heritage cities (La Laguna and Barcelona).
(2) Space and time dimension: the work of the students is based on specific temporality links and themes, articulated in specific environments.
(3) Social dimension (citizenship): the itinerary was articulated by including aspects, such as memories, social class, gender, ethnicity, and social and historical practices. In other words, the itinerary incorporated an approach to history with memory.
(4) Historical dimension (historical evidence): the itinerary was structured on heritage assets (both tangible and intangible) due to their historical significance.

MATERIALS AND METHODS

The general learning objective of the project was to contribute to the comprehensive training and acquisition of professional competencies, based on the creation of didactic itineraries through innovation in the uses of ICTs and their performance in collaborative learning methodologies. To respond to the general objective of the project, the following specific learning objectives were proposed: (1) to favor students' autonomy and protagonism in their learning and to develop skills for appropriate group work in a virtual collaborative environment; (2) to foster

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[2] Author's translation.

cooperation and inter-cycle work among students from different universities and degrees in virtual and intercultural contexts. (3) To motivate students to discern which information can contribute to learning, civic education, and cultural richness; (4) to identify and assess the approach and didactic treatment of early childhood and primary education in the Organic Law for the Improvement of Educational Quality (LOMCE) curriculum in order to develop valid didactic itineraries that would respond to curricular realities; (5) to encourage trainee teachers to investigate and define the commonalities between the Canary Islands and Catalonia's heritage assets; and (6) to design shared didactic strategies in non-formal educational environments. The main objective of the investigation, therefore, is to know the educational impact of the proposal in the training and development of skills of future teachers. In this sense, the teaching guides of the subjects involved in the project, in both universities, deal with competencies, such as to know and to teach how to value and respect cultural heritage; to develop didactic proposals that promote interest and respect for the natural, social and cultural environment; and to educate in social values and to guide the teaching and learning processes of the future teachers.

To this end, an intervention and subsequent research was carried out in which mixed methodologies were applied (McMillan and Schumacher, 2005; Cohen et al., 2007; Bisquerra, 2014).

Setting and Participants

The method used to select the research sample was non-probabilistic (Babbie, 2000). Students from ULL and UB (total $n = 195$) in the degrees of Early Childhood Education Teachers program ($n = 109$) and Primary Education Teachers program ($n = 86$) were selected in order to share their cultural heritage frameworks. The fact that both cities have the designation of World Heritage Cities, La Laguna as a historical site and Barcelona because of the modernist works of Antonio Gaudí, the *Hospital de Sant Pau*, and the *Palau de la Música*, made them the ideal places to propose the itinerary models.

For the development of the project, 17 working groups were created. Each of them with 6–8 members. The configuration of the groups was random but on the condition of being mixed both in the city of origin and university degree.

The subjects of the trainee teachers' training program from the ULL involved in the project were as follows: *Didactics of Social Sciences II: didactic aspects* (Primary education) and *Didactics of social knowledge* (Early childhood education), and those of their counterparts from Barcelona were *Social: scientific communication and verbal language* (Early childhood education) and *History and Historical and artistic heritage* (Primary education). This way, and in line with the philosophy of the project, students were brought in together to conform working teams, ensuring coordination between university students of the two degrees.

It is important to note that neither any of the students had previously participated in inter-university collaboration projects nor in the design of heritage itineraries or the development of inter-cycle educational programs within the framework of Social Science education.

Teaching Intervention and Materials

To achieve the aforementioned learning objectives, a didactic process was designed. Three phases were defined for this purpose, planning, design, and evaluation, and were carried out over a 6-week period.

For the development of the project, a virtual campus (Moodle) was specially created and hosted in the interface of the ULL, to which all participants had access. It contained not only the project instructions and the links for the submission of the itineraries, but also useful bibliography, the school curricula of both communities, tutorials of interest for collaborative distance work, a forum for consultation with experts on each educational stage, and the links to virtual classrooms for each working group's meetings. The shared virtual campus was the main tool for communication between the 195 students and the four teachers in charge.

In the first phase, the planning of the itinerary, each group had to start their conceptualization of the itineraries, one for each city. This planning was framed under a shared chosen theme for both cities and selected upon the possibility of offering continuity for both educational stages. Clear instructions were given in terms of landmarks to include in the itinerary. In the early childhood itinerary section, a maximum of three landmarks were to be included, and in the case of the section for primary level, the number of itinerary landmarks was between 3 and 6. To do this, it was essential to carry out a historical analysis of each city in order to select their most representative heritage site, consistent with the chosen theme. Within this first selection, students also had to state the didactic and learning objectives (see **Table 1**).

The second phase was the core of the project, where students had to develop the didactical design of the itineraries. Students had to frame the heritage design in curricular terms for both autonomic communities and for both educational levels. This

TABLE 1 | Actions and timing of the project's three phases.

Phase	Actions	Timing
1	(A) Historical exploration of our cities: brief presentation and commonalities of the cities.	2 weeks
	(B) Conceptual presentation of the Itinerary: subject, temporality, and educational levels.	
	(C) Didactic justification and learning objectives.	
	(D) Presentation of typology points to be included in the itinerary.	
2	(A) Title and writing of the itinerary.	3 weeks
	(B) Learning objectives and link to the curriculum.	
	(C) Timing (calendar) of the itinerary.	
	(D) Route of the itinerary.	
	(E) Development and working detail of the itinerary.	
	(F) Learning assessment instruments.	
	(G) Consulted and quoted bibliography.	
3	(A) Self-analysis and evaluation of the itinerary.	1 week

was undoubtedly the most elaborate phase, as they had to define the educational activities for each educational stage and heritage site and frame it within the school year and define the learning assessment process (see **Table 1**). Finally, students had to illustrate the itinerary on Google maps.

In the third phase, students had to critically evaluate the itinerary design. They had to consider an assessment of the theme selected in accordance with the educational stages, the quality of the designed activities, and the proposed evaluation procedures. As a result of their critical view of the itinerary, students were called to propose aspects to improve it.

Instruments and Data Collection Procedures

As the first two phases are directly linked to the professional competencies analyzed in this paper, the results shown will be focused on this first couple of phases. In order to verify the formative capacity of the intervention, two procedures were applied, each with its corresponding instrument. On the one hand, learning outcomes were collected and valued by a learning assessment scale. On the other, the perception of the students was explored before and after the intervention by an initial (pre-test) and final (post-test) questionnaire.

The assessment scale was constructed according to the learning objectives of the proposal, considering the different generated products (see **Table 2**). The scale, which evaluated the different phases of the intervention, had five performance levels, not observed, insufficient, sufficient, good, and excellent, and was applied by pairs of teachers, thus reaching a consensus on the level of achievement of each indicator.

For the purposes of this paper, the elements assessed and included in the analysis are the following:

Phase 1: Selection and justification of the itinerary:

- Historical synthesis of both cities.
- Argumentation and justification of the itinerary (topics, temporality, and spaces).
- Didactic justification of the itinerary in general (Social Sciences learning).
- Selection and justification of the landmarks of the itinerary.

Phase 2: Didactic design of the itinerary

- Adaptation of the activities to the levels of the students (early childhood and primary education).
- Early childhood-primary continuity.
- Virtual itinerary on Google maps.

The questionnaire, applied prior to and at the end of the intervention via Google Forms, assessed student's perception of the main concepts developed by the project, at the same time that student's self-perception on skills developed by the project were collected. The questionnaire included a total of 22 open- and close-ended questions –a four-point Likert scale with Cronbach's alpha of 0.693, acceptable in multidimensional instruments according to Taber (2018). Fifteen of the questions were common to both questionnaires, and seven of them were only asked in the post-test.

TABLE 2 | Synthesis of the assessment scale in phases 1 and 2.

Phase	Content and products evaluated	Maximum score possible on the instrument (proportion within the activity)
Phase 1	Initial design of the itinerary: historical research of the cities, selection of the topic to work on and didactic justification of the heritage site.	16
Phase 2	Didactic design of the itinerary: selection and design of the learning sequence that includes the itinerary and visual elaboration of the itinerary on Google maps.	22

The survey was structured in four dimensions: conceptualization, teaching capacities, working group capacity, and project evaluation (only post-test).

The questions analyzed for the purpose of this paper are detailed below in **Table 3**.

Data Analysis Techniques

In order to have a global view, independently of the university, the analysis of the data included specific procedures according to each type of question and instrument.

The open-ended questions were analyzed with the IRAMUTEQ software, by using the Lexical Analysis of Co-occurrences in Simple Sentences of a Text (ALCESTE) analysis of keywords in context (Illia et al., 2014). Specifically, the Reinert method of descending analysis was used for the entire corpus of open-ended questions, differentiating between the two questionnaires administered (De Alba, 2004). In this way, it was possible to investigate in comparative terms the discourses offered by the students prior to and at the end of the intervention.

The closed-ended questions of both questionnaires were analyzed using descriptive statistics, specifically by cross-tabulation procedures and verifying, when possible, the random or non-random distribution of the results between pre-test and post-test. The chi-square statistic was used for this purpose. Moreover, a descriptive statistic was used for the analysis of the fourth dimension of the questionnaire (post-test only) and for the results of the assessment scale results.

Ethical Dimension

In addition to the procedures mentioned above, some aspects relating to the ethical dimension were included. On the one hand, the project was explained to students and it was explicitly stated that the data collected would be used for scientific and academic purposes. Their informed consent was requested. The decision was respected and the responses of the only person who rejected the possibility of using the responses for scientific purposes were deleted and not included on the sample, nor in the analysis. On the other hand, the general results were shared with students in a report written especially for the students who expressed their desire to receive a copy of the results.

TABLE 3 | Table of specifications of the questions analyzed in the initial and final questionnaire.

Dimension (questionnaire)	Description	Question type	Questions analyzed
(1) Conceptualization (initial and final)	Questions aimed at identifying the main conceptions of students about heritage and its didactic use	Open	(1) Write five words that you associate with heritage as an educational tool. Separate them with a comma. (2) List 5 concepts or words in which you consider that this didactic proposal could enhance your learning. Separate them with a comma. (3) Choose one of the concepts you noted in the previous answer and explain why you consider it to be relevant
(2) Domain of didactic skills (initial and final)	Dimension that explores the perception in the domain of the capacities associated with the design of didactic proposals using heritage in interuniversity work in transition stages	Closed and open	(4) Indicate the degree of ability or confidence you feel in the following skills. (4a) Early childhood education to primary education transition processes. (4b) Interdisciplinary teamwork. (4c) Proficiency in the creation of didactic itineraries.
(3) Mastery of group work skills (initial and final)	Dimension aimed at verifying the perception of students about their ability to work in teams	Closed	(5) Indicate the degree of difficulty you think there is in carrying out an inter-school and/or inter-cycle project. (5a) Communication between participants. (5b) Technological mastery of the participants. (5c) Organizational capacity within the group.
(4) General evaluation (initial and final)	Dimension that explores learning perspective thanks to the execution of the project	Open and Closed	(7) Mark from 1 (a little) to 4 (a lot) the areas in which this project has benefited you. (7a) To know strategies to prepare an itinerary.

RESULTS

The intervention aimed at developing the future teachers' professional competencies, in relation to teaching autonomy, inter-cycle work, and the development of didactic routes. Positive results can be seen in both sources, students and teachers.

The overall analysis of the open-ended questions in the survey allows us to identify some trends in the perception of students. One of the first issues that emerge is the centrality of the experience in their narratives (**Figures 1**, **2**). Thus, while prior to the intervention, the ideas of knowledge, activity, and their function in the learning process were not linked, after the intervention the relationship between these elements became closer.

Moreover, at the end of the didactic proposal (**Figure 2**), it is evident that teamwork plays a structuring role in the generation of knowledge and its didactic application, which are complemented by positive explicit positive ideas. At the same time, the concept of heritage became more complex with the intervention. Students changed their view from a content to be taught prior to the intervention (**Figure 1**) to a dimension of effective work in the environment with a sense of citizenship (**Figure 2**).

Finally, the narratives reported by the students in their intervention reveal a positive and explicit degree of satisfaction about the development of the project, especially in relation to learning acquirement, in terms of teamwork and the transition between educational levels.

View of the students is consistent with the assessment made by the teaching staff, especially in terms of learning outcomes. The analysis of the assessment scales, in the items about the design of the itinerary (phases 1 and 2), shows that the learning objectives

of the project were achieved, although the maximum levels were not reached by the participants.

The average scores of the phases that assessed the achievement of the itinerary were 12.17 (out of 16, SD 1.88) in phase 1 (oriented to the selection and justification of the places for the implementation of the itinerary); while phase 2 (didactic design of the itinerary) obtained positive results, although slightly lower than the first phase (average score of 16.33 out of 22, SD 2.42).

In general terms, the results of both phases were homogeneous (Pearson's coefficient of variation: 0.14 in phase 1 and 0.15 in phase 2), which indicates that the learning outcomes do not show significant differences between participants, and learning outcomes in each phase were common to all working groups involved.

These general results can be tinged by looking at the specific performance of certain assessed aspects, in detail below.

Designing Heritage Itineraries as a Strategy for Social Sciences Teaching

The core of the whole project was the design of heritage itineraries of the cities of Barcelona and La Laguna. The assessment scale results show that the discovery of both cities and the detection of common points between them (**Graph 1**) obtained 40% insufficient and sufficient levels, as the chosen information was sometimes inaccurate and the sources of information non-existent. Only 13.3% obtained the maximum score (excellent) in this item. Similar results were obtained in the justification of the points to visit with the itinerary. Better outcomes were shown in the formulation of learning objectives to the selected themes to work with and the selection of heritage sites, especially in their adaptation to the two educational levels (early childhood and primary). A satisfactorily level was obtained in 83.3%
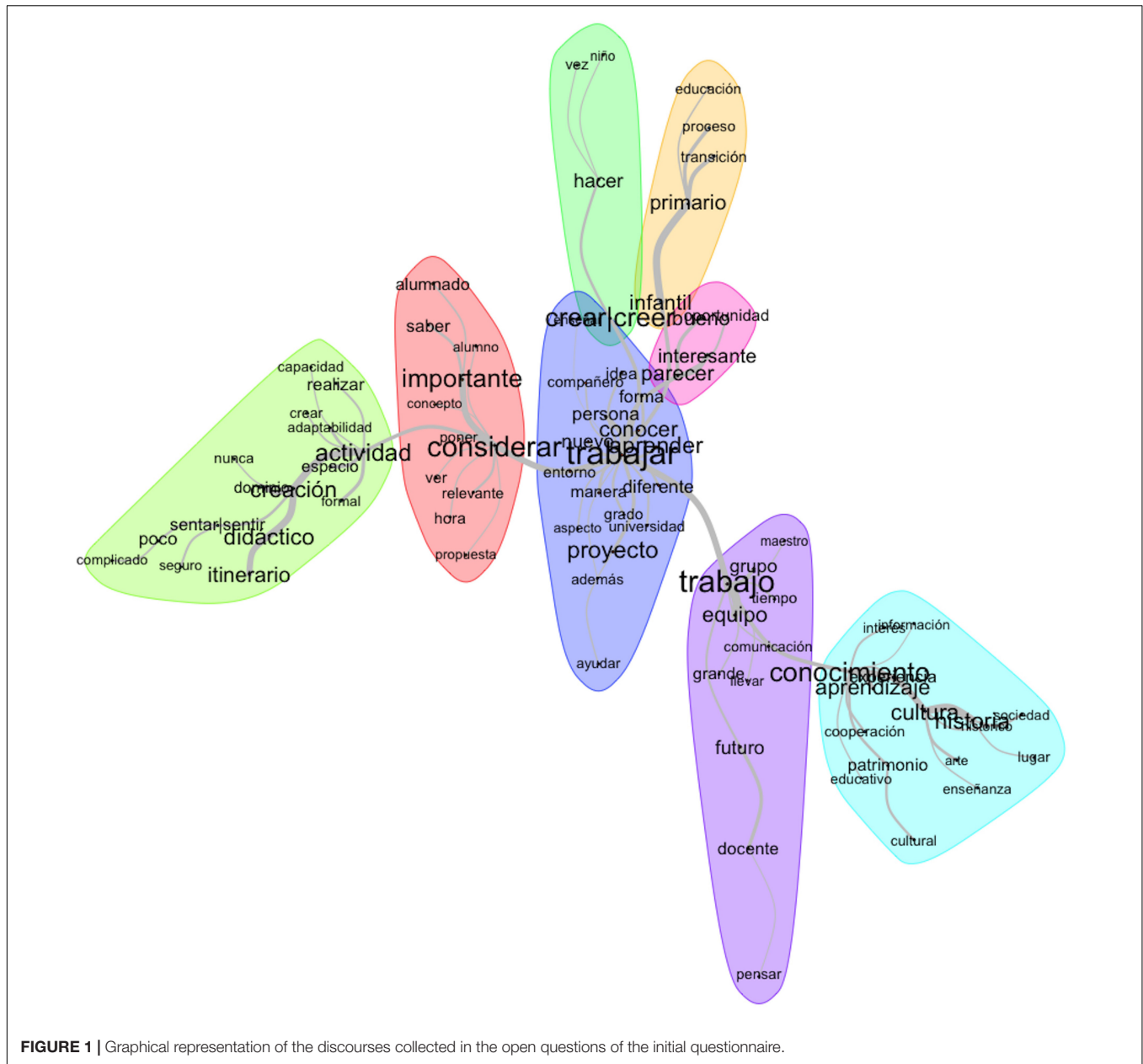
FIGURE 1 | Graphical representation of the discourses collected in the open questions of the initial questionnaire.

of the itineraries. The criterion of adequacy of the designed itinerary obtained high scores, and 33.3% of them received the highest ones.

The questionnaire shows that after the intervention, students seem to feel confident with the designing of heritage itineraries due to the intervention. If we look at the students' perception in the first questionnaire, 41.1% said they were fairly or very confident in the creation of didactic itineraries. At the end of the project, 81.1% considered themselves to be prepared to use this strategy. The application of the chi-square statistic makes possible to link the results directly to the implementation of the project, as it is not random (**Graph 2**).

Finally, the high degree of confidence shown by the students in the final questionnaire stands out, placing 88.8%

between the values of medium and high ability in terms of knowledge of strategies for preparing didactic itineraries (**Graph 2**).

Development of Professional Competencies

Another of the issues addressed by this project was the field of professional competencies. Here, the ability to deal with the transition from pre-primary to primary education was one of the most important ones. In the elaborated didactic proposals, more than 75% of the pieces of work were managed to satisfactorily develop interventions that favored the transition from one educational level to the other (**Graph 3**). Thus, the
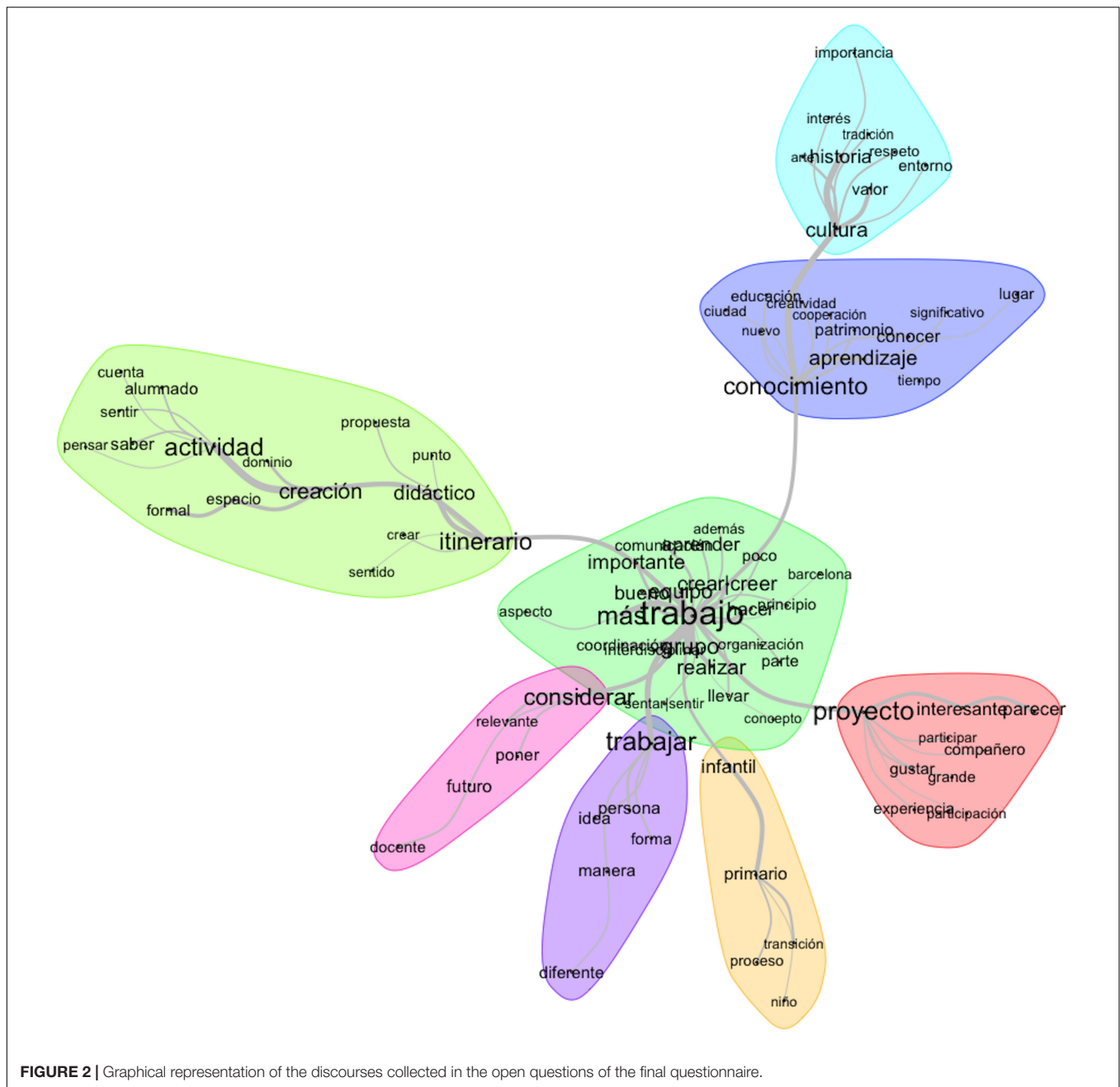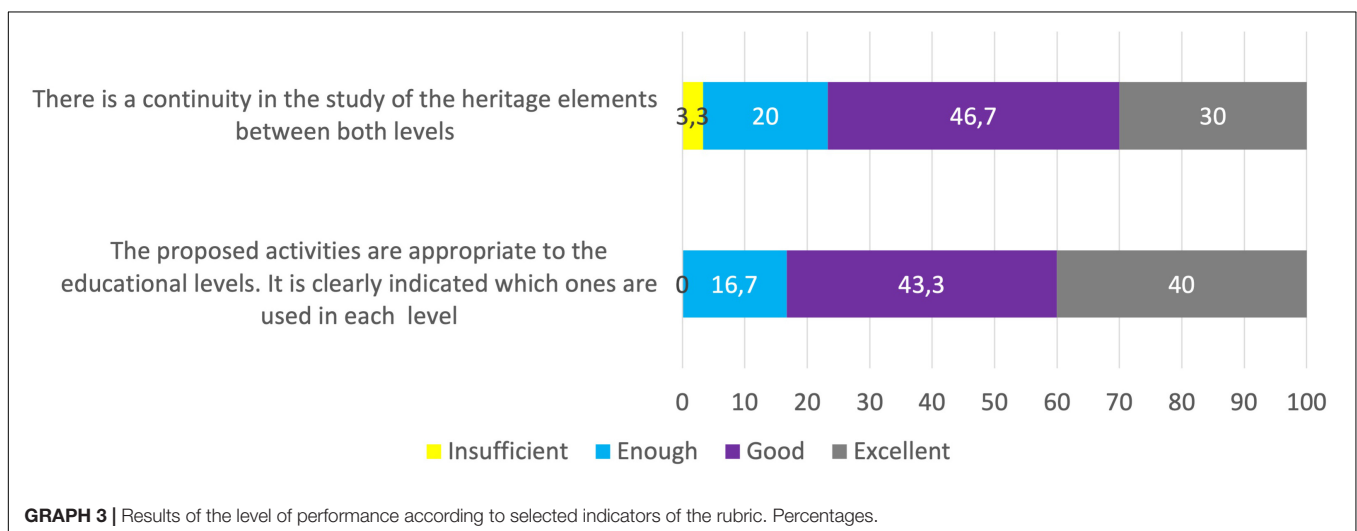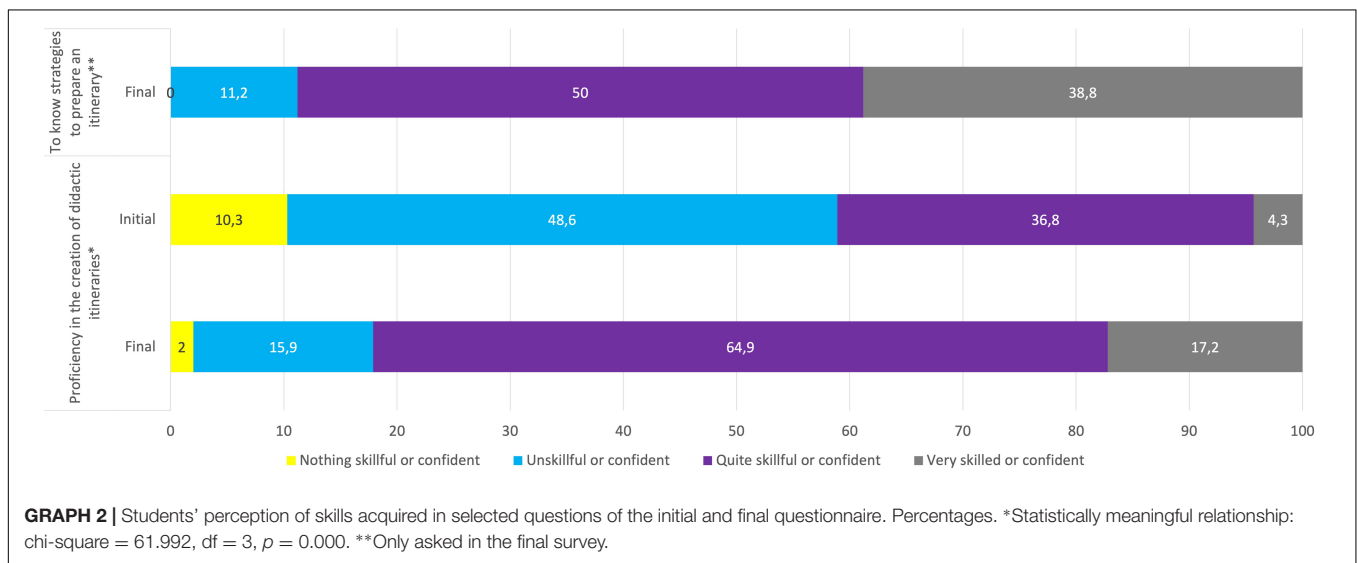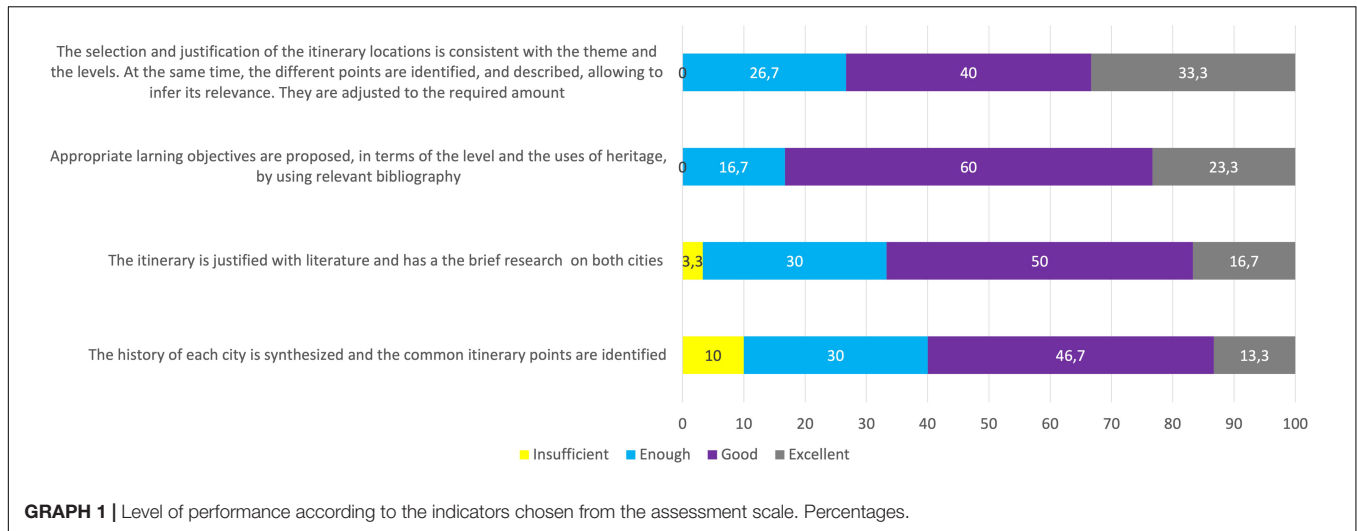
FIGURE 2 | Graphical representation of the discourses collected in the open questions of the final questionnaire.
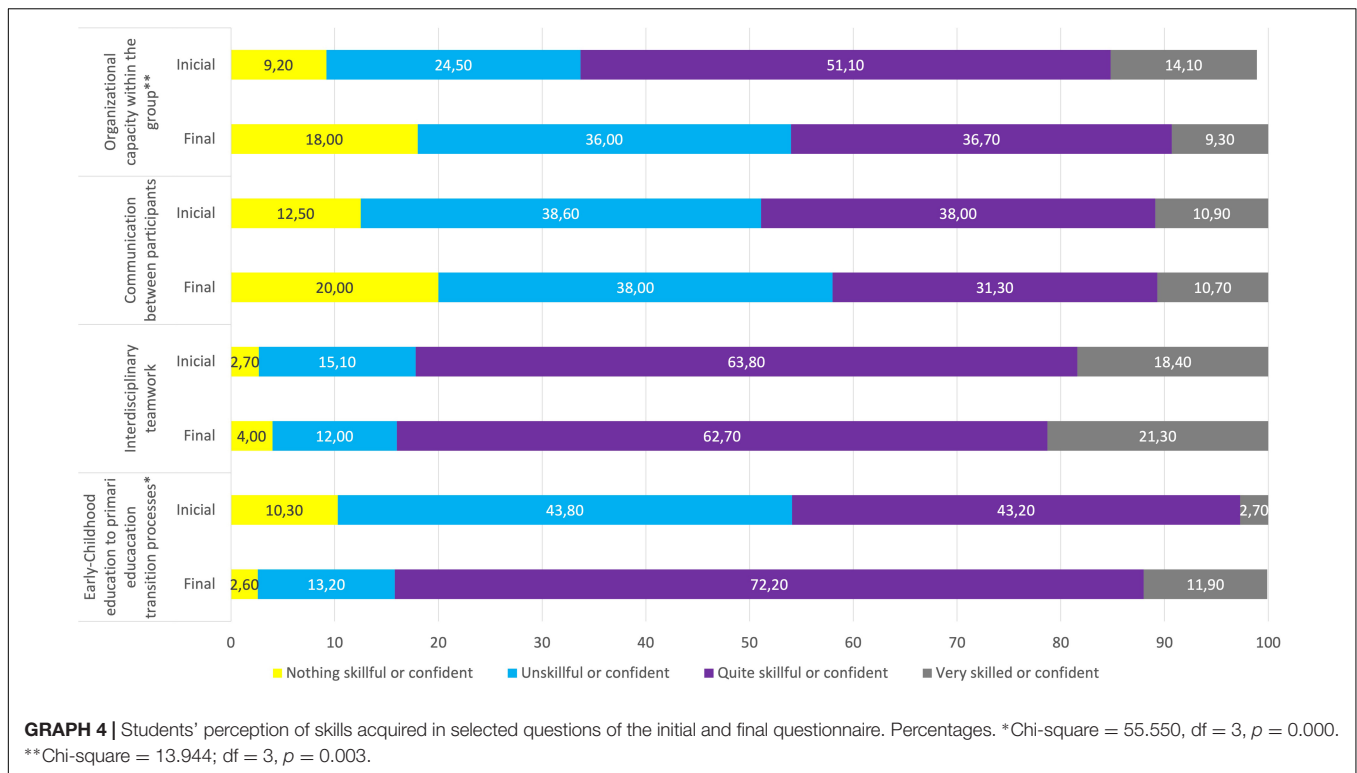
didactic itineraries used the different chosen points to work on Social Sciences at early ages (5–7 years) with a continuity view. However, it was the ability to propose activities according to each level, the aspect with better results (83% of the itineraries achieve "good" or "excellent" scores).

Accordingly, students seem to feel quite confident about the ability to develop transition activities by using itineraries. The comparison of the results of the initial and final survey shows significant differences in their confidence levels (**Graph 4**). While in the initial questionnaire, less than 50% of the students declared themselves fairly or very confident in planning transition routes, almost less than 80% considered themselves capable of doing so at

the end of the project. The application of the chi-square statistic shows that these results are related to the intervention and cannot be explained by chance (**Graph 4**).

The questionnaire (**Graph 4**) also shows that due to the intervention, the declared capacity of teamwork was calibrated. If prior to the intervention, students declared to feel quite or very confident in more than 64% of the answers, after the intervention only 46% felt so, and this result can be attributed statistically to the intervention. Others involved competencies, measured in pre- and post-test, did not show major changes between the initial and the final questionnaire, and their results cannot be statistically linked to the intervention (**Graph 4**).

GRAPH 1 | Level of performance according to the indicators chosen from the assessment scale. Percentages.

GRAPH 2 | Students' perception of skills acquired in selected questions of the initial and final questionnaire. Percentages. *Statistically meaningful relationship: chi-square = 61.992, df = 3, p = 0.000. **Only asked in the final survey.

GRAPH 3 | Results of the level of performance according to selected indicators of the rubric. Percentages.

GRAPH 4 | Students' perception of skills acquired in selected questions of the initial and final questionnaire. Percentages. *Chi-square = 55.550, df = 3, p = 0.000. **Chi-square = 13.944; df = 3, p = 0.003.

A special mention should be made to the questions referring to the students' digital competence, as it is present in both the general objective of the project and the specific objectives. In addition to using the virtual environment as a communication and work tool, within the didactic proposals, students were required to generate urban itineraries for both cities using the Google maps tool. Learning results show good proficiency in the uses of the resource, as 66.7% obtained fully satisfactory results (**Table 4**).

In addition, 16.3% of the respondents perceived using technology as quite difficult or very difficult at the beginning of the project, while 83.7% considered technology as "not" or "little difficult" (**Graph 5**). But if we compare their answers in the initial and final questionnaire, we see a slight improvement that places most of the answers in low difficulty levels, reducing as well, the percentage of students that felt the uses of technology "quite" or "very difficult." However, these results cannot be statistically attributed to the intervention.

TABLE 4 | Results of the level of performance according to indicators chosen from the assessment scale. Percentages.

| Assessment scale level	The Google maps itinerary corresponds to the points established in phase 1
Insufficient	0
Enough	0
Good	33.3
Excellent	66.7
Total	100

Consistently, students obtained very satisfactory learning results in their didactic proposal according to the teaching team's criteria (see **Table 4**).

DISCUSSION AND CONCLUSION

In this paper, we have analyzed the general results of an experience on educational innovation in Higher Education, in which inter-university cooperative learning, heritage education, and the competencies' approach converge. Students, as learning subjects, have occupied a central position in this process (Albort-Morant et al., 2017). Moreover, due to the inter-university work, the physical barriers of the classroom were broken down by connecting the students of the early childhood and primary education teaching degrees and by actively using ICTs.

In general terms, the results show a significant level of satisfaction on behalf of the students. Self-regulated work, teams' organization, the development of communication skills, inter-cycle coordination, the understanding of the training potential of heritage resources from the local environment, and in short, their overall contribution to the strengthening of professional teaching skills underlie as key reasons for a positive self-perception, with an impact on the motivation of the participants.

Therefore, this motivational boost, confirmed by the questionnaires, was not only due to the fact of working with real contexts and as primary sources, but was also a consequence of the whole set of methodological ingredients from cooperative learning (Johnson and Johnson, 2019) and the contextual

GRAPH 5 | Students' perception of their mastery in the use of technology. Percentages.
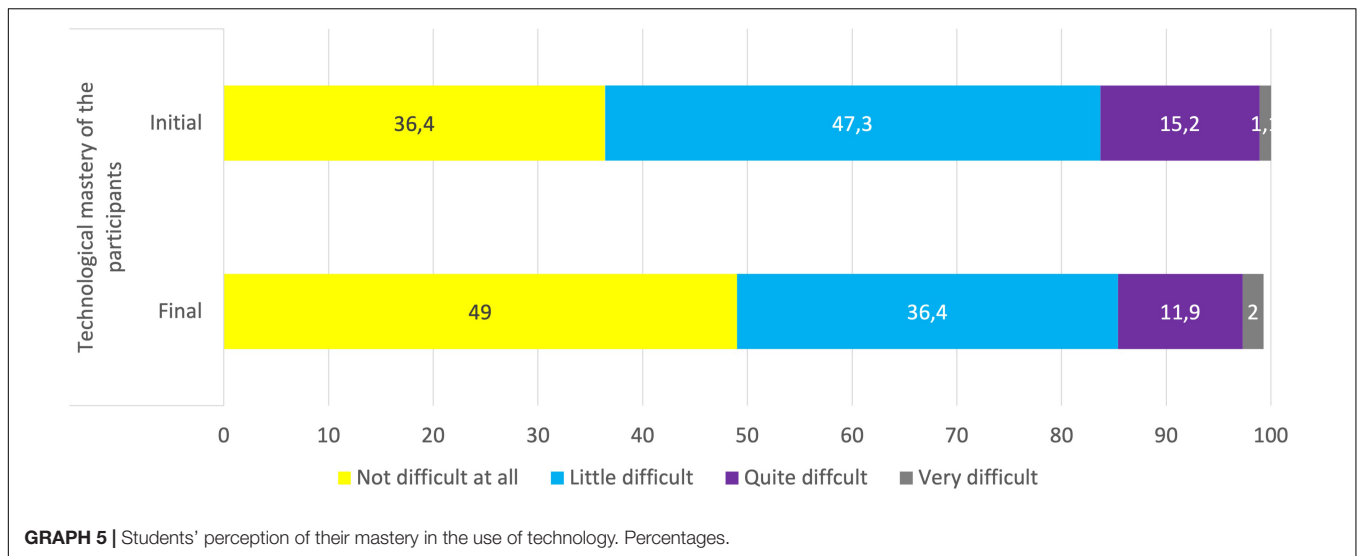
and experiential didactics (Chapman et al., 2016; Guevara-Bustamante and Moreno-Muro, 2021). These elements were the backbone of the working proposal (Cañabate-Ortiz et al., 2014).

The core role in the learning process given to students prioritized autonomous learning. Students became actively involved in their own learning process through a commitment to their work group and their achievement. This enabled them to gradually become aware of their learning process, their strengths, and weaknesses. The differences found in the answers to the open-ended questions in the pre-test and post-test survey, especially in relation to soft skills (inherent to professional competencies) favored, at the same time, self-regulating learning mechanisms.

The self-perception of the students on learning and the assessment results observed by the teaching staff stands out in consistency among the two sources. These results allow us to deduce that, in general terms, the experience had the expected impact on learning, even when desirable achievements were not always observed in all the measured aspects.

Likewise, the results seem to endorse the inclusive nature of this proposal, since it has worked as a promoter of an experience that can be considered successful for most of the participants, regardless of the personal or contextual factors. Students at both universities applied an approach to Social Sciences, and specifically to heritage education, to develop social and critical thinking (Gil, 2020), which will allow them to start promoting it in the early stages. Nevertheless, these results also show that one of the most obvious areas for improvement is undoubtedly the aimed at getting to know their own cities and their heritage, based on more and better critical work with primary and bibliographic sources.

When assessing the planning, documentation, and design of the heritage assets, the historical aspects in terms of content had the lowest scores, compared to the development of the ones with a didactic nature. Knowing of the past of their cities and the selection of working topics for the itinerary posed difficulties for students, and the learning outcomes show a wide margin for

improvement for the future. Thus, the limitations in terms of student's historical knowledge reduced the complexity of their designs, raising the importance of future teachers having high content knowledge. Still, appropriate choices of the heritage landmarks were proposed and their didactic exploitation as learning resources stated. Students became aware of their lack of historical knowledge, which may explain their perceived insecurities when using heritage itineraries as didactical tools.

The panorama described above is consistent with the structural weakness in the Spanish education system in terms of heritage education as a basic element in the formation of a critical and participatory citizenship. This is a problem that has been widely documented and well described in manualistic studies (Estepa-Giménez et al., 2011; Farrujia de la Rosa et al., 2020), among others, which is not solved in secondary education, and whose effects are projected onto teachers in training.

Generally speaking, the learning outcomes measured in this study show that students do not face their university education with full basic proficiency strategies in the use of technology and information competencies, especially in those fields aimed at active work with primary and secondary sources. At the same time, they have not fully incorporated mechanisms to make use of cultural heritage as a didactic resource and as a tool for learning. However, the objectives of previous educational stages follow these lines within a competency-based approach to education (Valls and Parra, 2018).

In the specific case of this proposal, the immediate solution involves reformulating the first phase (research and knowledge of the cities), incorporating demonstrative resources, instructions, and activities to guide the analysis of heritage as a document for knowing the past (Callarisa-Mas and Sabido-Codina, 2020; Ballesteros-Alarcón, 2021; Estepa-Giménez and Delgado-Algarra, 2021).

Within the scope of the professional competencies promoted by this project, it seems clear that we can consider the configuration of inter-cycle teams to be a success according to learning results, specifically in terms of the continuity

between early childhood and primary education. Once again, the differences between the pre-test and post-test results reflect the fact that the learning process, although positive and successful, provokes students toward a critical perception of their own professional skills.

Developing knowledge, skills, and attitudes toward the educational use of technology in the digital era was one of the objectives pursued, being one of the most demanded competencies among today's teachers (Ibáñez-Etxeberria et al., 2019). In the digital revolution which humanity is experiencing, progressive digitalization has put schools in a complicated situation, blackboards, chalk, and paper books still being daily standard tools (Santacana and Coma, 2014). All this became more than evident with the recent pandemic crisis (Gutierrez-Moreno, 2020). Indeed, it was during the pandemic that this project was developed, in which technology became the virtual scenario that interconnected students from both universities. The percentage of participants who claim to have a mastery of basic digital technology is surprising, but even more so is the percentage of the ones that recognize to feel that technology is quite or very difficult. Although the results of the project reflect an improvement in their technological skills, once again the gaps in the current educational programs dealing with this competence are evident. Students, as citizens who relate, live, and communicate digitally, show a lack of skills in technology uses and a slight mistrust in their own abilities to use technology as an ally in the classroom. Thus, digital competence continues to be a challenge and a pending subject to be developed among future teachers.

To sum up, the overall data collected show the suitability of the proposal to achieve a high degree of attainment of the objectives set out in the research. The students have experienced a significant improvement in the skills and competencies mobilized in the learning process, as reflected in the evaluation evidence, and have also become aware of their main strengths and weaknesses. It supports that when learning is meaningful and when regulation and reflection on the process is encouraged, critical awareness increases in students' self-perception of their own training. Acquiring this awareness of what one knows, and what one does not know, opens a pathway in favor of autonomous learning with a strong potential for the development of professional teaching competencies. The conception of a training proposal as a process of research in action, invites students to actively participate, to work in groups, to carry out professional tasks, and to commit themselves to shared learning objectives. This is perhaps the main implication that derives from this proposal, since it evidences a didactic strategy with a strong potential to promote the much needed renewal of teaching processes in early childhood and primary education.

This educational project has involved working toward constructing the concept of heritage as a basic resource for the performance of a contextual didactics. It involves the relation between school and its own environment by encouraging students to become critical citizens, achievable by the promotion, since earliest ages, of intellectual interests on knowledge, conservation, and enjoyment of the cultural assets that appear in their everyday landscape. However, as regards to historical research of the cities and to the selection of heritage assets (Barriga-Ubed and Sabido-Codina, 2020), a series of improvements must be introduced in the design in order to enable university students to transform their pre-conception of cultural heritage. In this sense, the result of the project shows the need to raise awareness among trainee teachers in considering the children's point of view toward the analysis of their reality, by understanding it as an educational mechanism that endows schools with their social significance.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

AF designed the project, data collection, and analysis. TM-G, CG, and IS-R participated in data collection, analysis, and interpretation of the results. All the authors contributed to the article and approved the submitted version.

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