Research Paper

Language Teacher Development in Computer-Mediated Collaborative Work and Digital Peer Assessment: An Innovative Proposal

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Abstract

This research paper explores the integration of digital technologies in language teacher development, focusing on computer-mediated collaborative learning (CMCL) and peer assessment in digital environments. The research was carried out at the National University of Distance Education (UNED) in Spain, in a TEFL course, with 518 student-teachers. The research methodology included both quantitative and qualitative techniques, and the results indicated positive satisfaction levels, especially in these dimensions: clear goals and objectives, appropriate assessment, and appropriate workload, with both learning in digital environments and the quality of teaching particularly highlighted. Additionally, statistically significant differences in the final grades were observed between the MS Teams users and the ones not following CMCL. Finally, the influence of digital learning was demonstrated across a large portion of the other variables according to the students' perception of it.

Keywords: Computer-Assisted Learning; Collaborative Work; Peer Assessment; Information and Communication Technologies; Innovation.

1. Introduction

This article presents a study conducted at the National University of Distance Education (UNED) in Spain during the 2021-22 academic year, with students enrolled in the TEFL program, showing an educational intervention that encouraged student-teachers to use digital tools to enhance their collaborative work and peer assessment. First, there is an introductory discussion on the use of technology in distance education, and also a description of how collaborative learning and peer assessment can be developed in digital environments as part of language teacher development. Then, the method used in this research is explained in detail, contextualizing the study and describing the data collection tools. The article concludes with the presentation of the results, and their discussion and conclusions reached.

1.1. Use of Technology in Distance Education

The integration of technology in the educational field has brought about a significant transformation in all activities related to education and training (Cabero, 2016; Delors, 1997; García Aretio, 2019) whilst highlighting the need for change at all levels of the education system. The sustainable development goals set by the United Nations (UN) for 2030 include Goal 4, which seeks both to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all. In this context, the access to and use of technology become a necessity; it leads, amongst other features, to the development of new methodological models based on emerging technologies (UN, 2018).

Distance education has not been immune to this trend and has evolved towards online learning, following the principles of e-learning (Bates, 2004; Sangrà et al., 2011): A form of teaching and learning that uses electronic means and devices to facilitate access, enhance progress, and improve the quality of education and training. Bates (2001), one of the authors who has most extensively studied the use of technology in distance education, has reflected on the repercussions of technological advances in this educational mode. Technology is much cheaper, easier to use, and reliable, and as a

result, it is more ubiquitous; it is no longer the domain of education and technology specialists, but rather something used by everyone, especially our students. Furthermore, e-learning has brought with it the prevalence of multimedia environments, which facilitate innovative approaches, and which expand the range of available methodologies for teaching and learning. It is within this context that computer-mediated collaborative learning (CMCL) emerges, which we will now discuss.

Whereas distance educational institutions have, in many cases, been pioneers in the introduction of digital technologies and technological innovation, its mission seems to be now diluted by general widespread digital expansion in higher education and the proliferation of quality open educational resources (OER) and massive open online courses (MOOCs; Teixeira et al., 2018). These technological challenges are accompanied by those traditionally associated with distance education and its technology-supported structure such as poor retention, progression, and completion rates (Brown et al., 2015). Distance universities, therefore, need to adapt once again to pedagogical challenges derived from new technological needs and trends and take a leading role that allow them to stand out as distinctive. For instance, in the development of open framework technological infrastructure and the dissemination of the use of OER and open educational practices (OEP; Teixeira et al., 2018), or students' trust development in digital environments (Brown et al., 2015).

1.2. Computer-Mediated Collaborative Learning (CMCL)

CMCL can be defined as joint learning with peers, using computer support (Schmitt & Weinberger, 2018). It fosters situations leading to the coconstruction of knowledge via small group exchanges, usually with the aim of solving a problem or creating a product, or both (Hernández-Sellés et al., 2019). Among the benefits of collaborative learning, we might mention the promotion of self-esteem, anxiety reduction, an improved understanding of diversity, improvement in interpersonal student relationships, and stimulation of critical thinking. Empirical studies have shown that CMCL enhances individual learning and performance, as well as student satisfaction (Johnson, Johnson, & Stanne, 2000; Kwon, Liu, & Johnson, 2014; Oakley, Felder, Brent, & Elhajj, 2004). However, given the differing characteristics of online and face-to-face interaction, implementing CMCL is not without its challenges and difficulties.

In a recent study on new technologies in education, the suitability of these factors was confirmed (Valverde, 2001). Computer-mediated communication requires students to coordinate more explicitly than in face-to-face environments, given that the information and signals brought by the social context in a face-to-face interaction are lost in digital environments (Schmitt & Weinberger, 2018). Another challenge of CMCL relates to motivation and lack of participation. As Nistor and Neubauer (2010) show, participation in online courses often decreases rapidly after the first week, and often precedes dropout. The difficulties generated by the heterogeneity of group members, their differing levels of commitment, and the complexity of achieving equitable distribution of workloads are also well documented. Although collaborative learning seeks to establish equality in participation and access to learning, some studies indicate that sometimes the exact opposite may occur (Nihalani et al., 2010; Schmitt & Weinberger, 2018).

The computer tools used in CMCL may be synchronous, as with video conferencing or virtual worlds (Hsiao et al., 2015) or, more frequently, asynchronous (Schmitt & Weinberger, 2018), using social networks and virtual learning environments. The most up-to-date software packages overcome the dichotomy between synchrony and asynchrony, as they include communication and collaboration platforms that combine both—for example the software used in this study, Microsoft (MS) Teams. Although it is not a platform designed specifically for education, several studies already endorse the usefulness of MS Teams for both training and CMCL. Hewson and Chung (2021) used MS Teams to promote online discussion and collaborative work, highlighting the benefits of creating an online learning community and improving interpersonal relationships, both between students and teachers and among the students themselves. On the other hand, Buchal and Songsore (2019) conducted a study on the educational use of MS Teams in which they particularly valued its effectiveness as a tool for coconstructing knowledge and peer assessment, as well as its ease of use and levels of student satisfaction.

1.3. Peer Assessment in Digital Environments

Peer assessment, understood as a process in which students take into consideration the level, value, or quality of their peers' performance under the same circumstances (Topping, 2009), has long been conducted in education. However, the turn of the millennium has brought still greater interest in promoting this type of assessment (Martín Monje et al.,

2014), driven partly by more student-centred pedagogical approaches (Boud & Falchikov, 2007). Peer assessment promotes active student participation and can be greatly beneficial for collaborative learning (Sadri & Tahririan, 2018), because, in CMCL environments, social and collaborative skills are necessary for effective assessment (Prins et al., 2005). When students participate in peer assessment, they need to communicate with one another, to negotiate criteria, and to ensure that the established deadlines for submission and evaluation of their work are met. Furthermore, in cases such as the one under discussion here, where the students under study are future teachers, they are encouraged to take on more responsibility in the learning process and gradually to develop assessment skills that will be crucial to their professional future (Seifert & Feliks, 2018).

This study presents the implementation of an educational innovation project aimed at fostering collaborative work and peer assessment in a context of distance evaluation, following the principles of e-learning and making use of digital technologies. The research questions posed were as follows:

1. What are the levels of satisfaction with the course shown by students after the educational intervention?
2. Is there any relationship between the educational intervention and learning as reflected in the level of performance in the subject?
3. What is the relevance of the variable digital technology as perceived by students?

2. Methodology

2.1. Context and Participants

The project designed around these research questions was carried out during the 2021-22 academic year at a higher education institution in Spain, the UNED. This university follows a semi-face-to-face pedagogical methodology, with a virtual campus and associated centres where in-person tutorials are provided. The subject in which the educational intervention took place (i.e., TEFL) was offered for the first time in 2021-22 and is an optional subject (5 ECTS) offered in the fourth year of the English studies degree. These optional subjects do not have in-person tutorials and are carried out exclusively in the digital environment.

TEFL is aimed at English studies degree students who are interested in becoming teachers of English as a foreign language. It serves as an introductory course prior to undertaking the Teacher Training Master's degree, providing students with an overview of the methodological principles of English language teaching and their practical application. The subject is organized into five units, covering the main areas of interest to future English language teaching professionals: (1) curriculum development; (2) approaches, methods, and assessment in the English classroom; (3) planning of teaching units; (4) assessment and creation of resources; and (5) incorporating history, geography, and culture into the English classroom (Turebayeva et al., 2020). The emphasis is not so much on acquiring purely conceptual knowledge as on training students to perform tasks through the design of practical applications for English language teaching.

Following the principle of learning by doing, a continuous assessment task (CAT) focused on the design, development, and presentation of a group-based EFL teaching proposal was designed. Continuous assessment accounts for 20% of the overall grade for the subject, whereas the remaining 80% is obtained through a final exam on the theoretical content of the different units. The CAT consists of a compulsory part and a voluntary part. The compulsory part involves developing a didactic proposal that details the chosen theme, objectives, content, and educational level to which it will be applied, as well as the sequence of proposed activities. The virtual course provided by the university is not designed for computer-mediated collaborative work, so, given its potential for CMCL, an ad hoc space was created in MS Teams, which enables, among other features, collaborative authoring, simultaneous content editing, real-time communication, and private group work.

In addition, the students had the opportunity to engage in a voluntary activity, to be carried out in the same digital space: the creation of a video in which they presented their teaching proposal and evaluated the work submitted by their colleagues. The completion of this task was rewarded with an additional half-point added to the final grade obtained. As for the participants, the total group consisted of the 518 students enrolled in TEFL. Of these, 250 followed the CMCL proposal and made use of the space created in MS Teams for collaborative work. A total of 419 students submitted the CAT, of whom 48 worked in private channels and completed the voluntary part, making full use of the digital tools

proposed in the research. Those who did not follow the CMCL proposal organized their collaborative work in more traditional ways, meeting in person or emailing each other the documents, instead of working collaboratively in a single digital space. The following section details the phases of development of this computer-mediated collaborative work.

2.2. Design of the CAT Using Digital Tools

As mentioned above, the educational intervention was carried out using various tools included in the Microsoft Office 365 package, which the UNED students can use for free and unrestrictedly. In this case, the tools used were MS Teams, MS Stream, and MS Forms. The following outlines the phases, objectives, and actions to be performed by the students in the design process.

Phase 1: In this initial phase, the teaching team created a collaborative group in MS Teams called Collaborative Space TEFL. Private channels were included at the request of the groups. These channels were intended to facilitate collaborative work by providing a secure and private space for communication among group members for organization, planning, and execution of the CAT. Additionally, an embedded wiki was set up in the general group channel to facilitate the review of theoretical content.

Phase 2: The second phase involved the students preparing a video presentation on their work on the CAT and then uploading it to the shared storage of the collaborative group in MS Stream (see Figure 1 below).
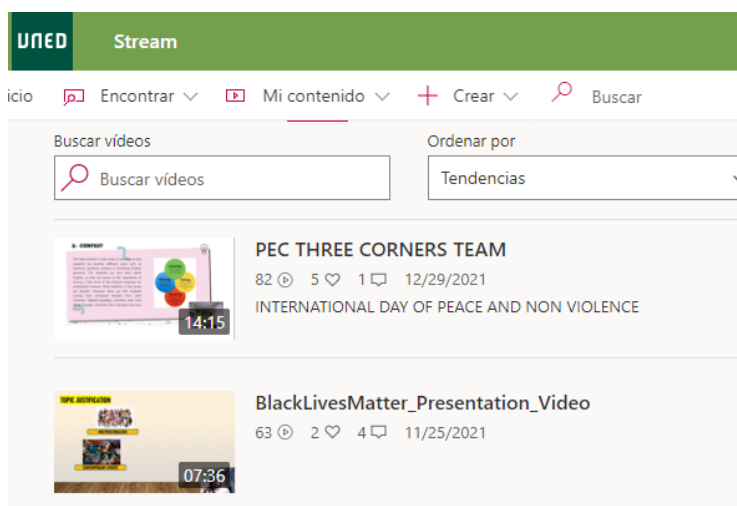

Figure 1. Viewing the Collaborative Space in MS Teams

Phase 3: This phase involved creating an evaluation questionnaire for insertion into each of the presentations uploaded to the collaborative channel in MS Stream. The students had to evaluate their colleagues' work by using a rubric that guided them in this task, paying attention to structure, content, presentation, group work, and verbal and nonverbal communication. Both the embedding of the questionnaires in the presentations and the development of the rubric with the guidelines to be applied in the evaluations were performed by the teaching team.

Phase 4: In the final phase, the students viewed and evaluated the video presentations created by their colleagues—collaborative output-based task—(Roohani et al., 2017) who had access to the entirety of resources produced by the participants as well as to the results of the evaluations (see Figure 2 below).
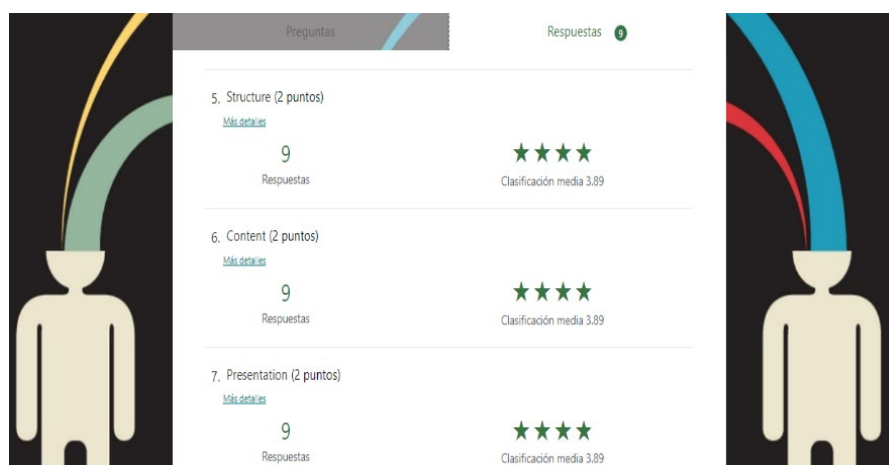
Figure 2. Viewing the Results in MS Forms

2.3. Data Collection

The research collected both qualitative and quantitative data. The qualitative data were collected via semistructured interviews with students who had made use of the digital tools and had completed both the mandatory and voluntary parts of the CAT. The quantitative data were taken from the grades obtained by the students at the end of the course and the satisfaction questionnaire, also completed at the end of the course. The Course Experience Questionnaire, originally developed by Wilson et al. (1997), has become a standard instrument to measure teaching quality (Ali, 2021), and it has been regarded as a key indicator of university performance, so it was appropriate to use in the context of the implementation of a new subject. This instrument approaches key determinants of students' approaches to learning such as curriculum, teaching, or assessment. Additionally, it explores digital learning as a variable also affecting the course experience, which is especially relevant given the nature of the educational implementation. This is the reason why digital learning is comprehensively approached in this research through the study of its significance and its relationship with the rest of quality indicators, as perceived by future foreign language teachers. The quantitative data, unlike the qualitative data, were collected by considering all the students of the subject, whether or not they had completed the voluntary part.

The satisfaction questionnaire adapted and validated (Al-Hoorie & Vitta, 2019; Zhang & Aryadoust 2022) the version of the Course Experience Questionnaire (Wilson et al., 1997) for Spanish speakers (Ugalde et al., 2012) to the context under study. This questionnaire consists of five dimensions: (1) good teaching, (2) clear goals and objectives, (3) appropriate evaluation, (4) appropriate workload, and (5) digital learning. After adapting it to the context under study, Cronbach's alpha value was calculated to validate the reliability in the internal consistency for the dimensions explored. Table 1 shows that both the items belonging to individual variables and the total items included in the questionnaire obtained an $α > 0.7$ value, confirming the use of a valid instrument (Ali, 2012; Cohen et al., 2000). Each item included in the questionnaire was answered through a Likert scale (1-5) where 1 was "strongly disagree" and 5 "strongly agree." The distribution of the questionnaire was carried out via MS Forms:

Table 1. *Reliability of Internal Consistency for the Adapted Questionnaire*

Scale	Nº items	Cronbach's Alpha
Good Teaching	4	0,924
Clear Goals and Objectives	4	0,939
Appropriate Evaluation	4	0,789
Appropriate Workload	4	0,863
Digital Learning	4	0,905
Total	20	0,960

2.4. Procedure

Several different analyses were proposed in order to answer the research questions posed. Firstly, to find out the students' level of satisfaction with the course, the adapted questionnaire was distributed to the entire sample, and the responses were subsequently analyzed through descriptive statistics. The values of each item were grouped and segmented

into intervals according to the scores received, creating labels that considered the maximum possible score for each variable (20): for the entire questionnaire, this amounted to a maximum global score of 100. The segmentation of this score was reflected with the creation of four labels, assigned according to specific value ranges, namely: "very deficient" (0-25), "deficient" (26-50), "good" (51-75), and "excellent" (75-100).

The second research question sought to measure the effect on learning of the educational innovation through digital tools, the indicator of which was performance in the course. In this case, it was expected that the use of digital tools would have an effect at this level, so the following hypotheses were put to test:

- H_0: The average performance ranks in the course are not different between the contrasted groups (use of digital tools/nonuse of digital tools)
- H_1: The average performance ranks in the course are different between the two groups.

The analysis took into account the final grades in the course (final exam + CAT + voluntary assignment) of the complete sample and compared two independent samples, using the Mann-Whitney U test, for nonparametric variables according to the use or nonuse of the available digital tools.

Lastly, we sought to determine the significance of the educational intervention through digital technology in the student-provided evaluation. A classification analysis was, therefore, carried out for the proposal of descriptive models between the variables using the CHAID algorithm, for datasets that do not follow a normal distribution. Two binary values were taken: 1, if the value of the dependent variable was equal to or greater than the median for each model, and 0, if the value of the dependent variable was lower than the median in each case. The median was used as the reference value due to the asymmetric distribution of the variables obtained through the Kolmogorov-Smirnov test. The variable of interest under study was "digital learning," due to the nature of the educational innovation, so the analysis focused on finding out whether this variable allowed the classification of subjects who obtained values higher than the median in their satisfaction evaluation as reflected in the remaining variables. The significance of the use of digital tools in the intervention was also studied through open questions included in the questionnaire, which were analysed through the observation of specific cases or inductively.

3. Results

3.1. What Levels of Satisfaction With the Course Did the Students Show After the Educational Intervention?

In Figure 3, we can see the overall assessment of the students who answered the questionnaire after taking the course ($n = 115$). If we consider the values represented by the scores gathered in the "good" and "excellent" intervals, which account for a total of 78.9% of the responses, satisfaction with the course can be considered especially positive. If we look at the breakdown of the values obtained in each variable (see Figure 4), the conclusions are similar, as all the variables under study obtained values that fall within the range for the "good" assessment, in two of them almost reaching the "excellent" value. A consistently favourable assessment of each of the variables by the students is, therefore, observed:
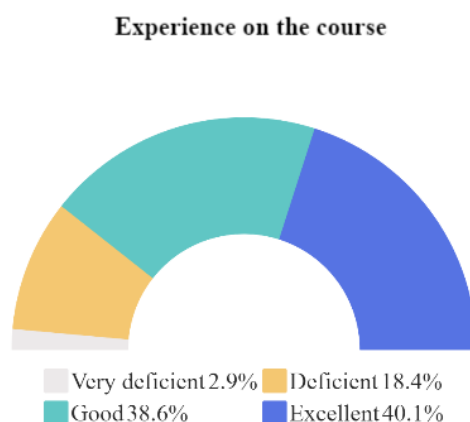
Experience on the course

Very deficient 2.9% Deficient 18.4%
Good 38.6% Excellent 40.1%

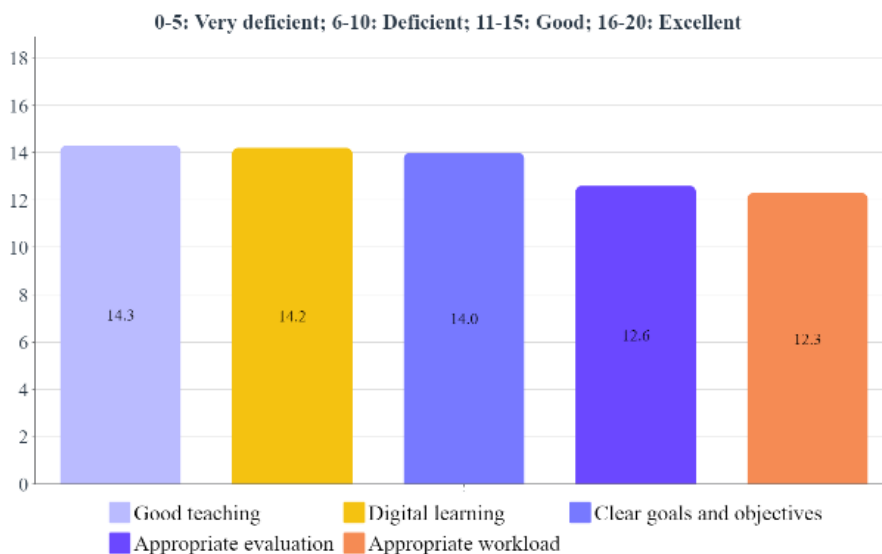*Figure 3.* Evaluation of Experience on the Course

Figure 4. Median Value of Each Variable

3.2. Was There Any Relationship Between Educational Intervention and Learning Reflected in the Performance Level of the Subject?

Table 2 shows the descriptive statistics of the two samples. The average final grade of the students who made use of digital tools (1) was 7.28 out of 10, whereas the average for the group that did not use the same tools (0) was 6.31. The descriptive statistics made it possible to show the difference between the compared averages (0.968):

Table 2. *Descriptive Statistics of the Compared Samples*

Use of Digital Tools YES NO		*N*	Mean	*SD*	Standard Error of the Mean
Total Score	1,00	65	7,2846	1,31175	0,16270
	,00	35	6,3171	1,27614	0,21571

The contrast of average rankings between independent samples carried out through the Mann-Whitney U test reflected statistically significant differences ($p < 0.05$; see Table 3). The null hypothesis was, therefore, rejected, and the alternative one was accepted: This states that the relationship proposed in the hypothesis is fulfilled in the population and refers to the existence of significant differences between the average rankings of the two compared groups:

Table 3. *Mann-Whitney U Test for Independent Samples*

	Total Score
U of Mann-Whitney	674.500
W of Wilcoxon	1304.500
Z	-3.348
Asymp. *Sig*. (Bilateral)	0.001
a. Grouping Variable: Use of Digital Tools YES NO	

3.3. What Is the Relevance of the Variable Digital Technology as Perceived by the Students?

The third research question was suggested in order to learn whether the score obtained with the digital learning variable for the level of satisfaction permitted the generation of explanatory models with any of the other variables. To do this, classification trees ($n = 5$) were developed, establishing each of the questionnaire variables as being dependent and independent. The median criterion (= > // <) was used to divide the subjects into two groups for the dependent variable. The classification trees presented in this section make it possible to observe significant relationships between the digital learning variable and the other variables.

As can be seen in Figure 5, the only variable that permitted the classification of the subjects based on the probability of their being above or equal to the median in terms of digital learning was the "good teaching" variable. In 94.4% of the cases, the subjects with a score equal to or higher than 15 (median) for "good teaching" showed a score equal to or higher than the median of "digital learning."
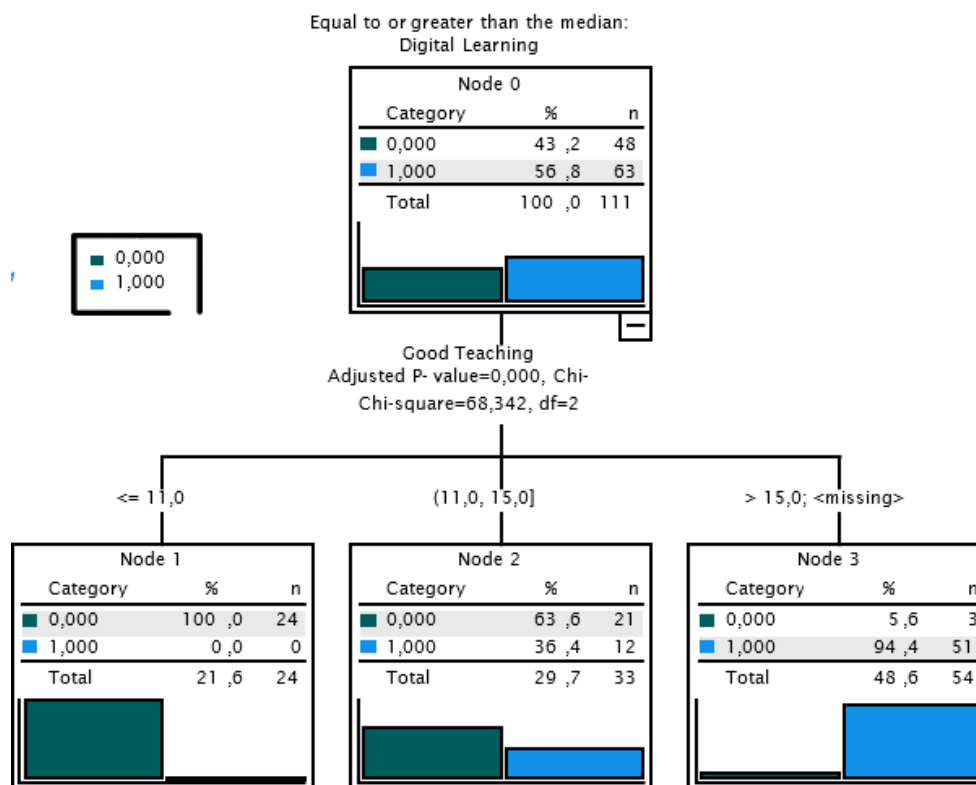

Figure 5. Classification Tree for the Dependent Variable Digital Learning

Regarding the classification trees generated to find out the influence of the "digital learning" variable on the other variables when they were studied as dependents, significant relationships are observed with "clear goals and objectives" and "appropriate evaluation." These relationships (see Annex) imply that the subjects who obtained a value equal to or greater than their median (16) for digital learning also reflected scores equal to or greater than the median in "clear goals and objectives" (97.5%) and "clear goals and objectives" (96.95%), which demonstrates the clear influence exerted by digital learning in these cases.

Finally, the semistructured interviews with the students focused on aspects such as collaborative work through MS Teams, the development of digital competence, peer evaluation, and the challenges and benefits of this methodology. The students overwhelmingly expressed their belief in the usefulness of MS Teams as an online collaboration tool, explicitly mentioning the suitability of its functionalities to the objectives set out in their course. However, the use of other common communication channels among students, such as instant messaging or email for the development of collaborative tasks, was also noted.

The CMCL within the context of the UNED turned out to be pioneering for many students, who were grateful to have this opportunity. Here is a statement provided by a student in the semistructured interviews: "It has been a good tool for collaboration and has facilitated our work. A good opportunity to get to know the platform and use it on other occasions" (Student 20). According to the comments, collaborative work allowed them to exchange ideas and opinions with classmates and also to feel that they were accompanied in the learning process: "… being able to compare opinions with classmates and discover that it was easier than if I had faced it alone" (Student 15); "… to share our ideas and points of view, as well as feeling less alone in a distance university" (Student 78). Peer evaluation was also positively valued,

with students highlighting its ability to develop critical evaluation, empathy, and become a support for the improvement of one's own work.

The perceived challenges had to do with lack of time, with lack of digital competence—which required extra dedication to the subject—and with the difficulties associated with organizing tasks among people who previously did not know one another. Here is a statement which reflects this issue: "... there is no easy way to connect and coordinate with classmates. The fact that they are complete strangers makes a difference" (Student 76).

4. Discussion and Conclusion

The purpose of this research was to obtain empirical evidence regarding CMCL in a distance education environment such as that of UNED. The application of this research was carried out in the degree of English studies, with students who had chosen the optional subject TEFL, intended for future EFL teachers. A collaborative work environment was designed using MS Teams in which, as a group, the students developed a didactic proposal of English as a foreign language. In this virtual space, they could also perform the voluntary part, which consisted of showing the final product via a video presentation and evaluating their peers' work. To this end, three research questions were posed, related to the students' satisfaction with the course after the CMCL teaching innovation project; the possible relationship between the educational intervention and an improvement in the results in the subject; and the students' perception of the significance of the use of digital tools when applied to learning.

In relation to the first research question (satisfaction with the course), the students expressed a globally favorable assessment because close to 80% (78.9%) considered their experience of the course to be good or excellent. In addition, when analysing the five elements of the questionnaire individually, there was a high degree of homogeneity in the ratings, with the quality of teaching and learning in digital environments, or digital learning, being the most valued. Kaur et al. (2022) show that these two variables are usually those that indicate greatest overall satisfaction in the course when this type of academic course satisfaction questionnaire is applied. In the case of the "good teaching" variable, as these authors indicate, high quality teaching today implies a full and effective integration of technology, so it is consistent that the questionnaire results offer similar values in the digital learning dimension.

Secondly, we inquired into whether there was a relationship between CMCL and an improvement in the students' grades. The results showed statistically significant differences in the average performance ranges between the compared groups, with the students who made use of MS Teams for the group task obtaining an average grade of almost one point higher. These results lend further weight to abundant evidence pointing in this same direction (Nwosu et al., 2018; Qureshi et al., 2021; Rasheed et al., 2022; Ullah et al., 2019; Youseff et al., 2022), even pointing to digital learning as a predictor of academic performance (Torun, 2019). The clear impact of the application of creative and collaborative methodologies through the use of technologies in the university context makes the need to strengthen this type of proposal very evident.

Our third and final research question has sought to find out the significance of digital learning with regard to its possible influence on the other variables included in the Course Experience Questionnaire (Wilson et al., 1997), which is used to understand students' perception of the quality of learning in higher education. Relationships of influences between the variable of interest and "clear goals and objectives" and "appropriate assessment" were observed, as is the importance of "good teaching" in "digital learning." These results align with conclusions obtained in previous studies (Alhabeeb & Rowley, 2018; Kaur et al., 2022), in which the perception by students of quality teaching has been associated with a higher level of general satisfaction with the quality of learning in higher education and the successful integration of technology at this educational stage. The predictive capacity of digital learning on other variables (Ali, 2021; Ejdys, 2021; Kaur et al., 2022; Torun, 2019) is also reflected, confirming its positive impact on other elements of the teaching-learning process.

As recommended in the application of the Course Experience Questionnaire (Asonitou et al., 2021), the qualitative results obtained through the semistructured interviews complemented the information obtained quantitatively. In general, students expressed their belief in the usefulness of MS Teams for collaborative work, finding its functionalities to be directly related to the assigned tasks. These results coincide with the recent study by Almodaires et al. (2021) where the same tool, given its quality, usability and functionalities, is likewise valued highly in a non-face-to-face educational context. According to Youseff et al. (2022), the lack of more specialized digital competence reported by some students cannot be remedied with training on one specific tool but is acquired via informal learning. It can be deduced, therefore,

that the reported problem of low levels would not have been solved with prior training in the use of MS Teams. Consequently, it would not have altered the research process.

Continuing with a view on the qualitative assessment of collaborative work according to the responses collected from the semistructured interviews, it can be stated that they obtained highly positive assessments of students, replicating the results in Herrera-Pavo (2021). The students at UNED appreciated the experience, as they had not previously participated in this kind of learning dynamic during their studies. Collaborative work has great potential in higher education, as it allows for the joint construction of knowledge as based on constructivist theories (Herrera-Pavo, 2021). This highlights the need to provide collaborative spaces from the earliest learning stages so as to promote interaction, and thus learning, between the environment and peers.

Similarly, the proposed peer evaluation, itself considered a form of collaborative work (Stančić, 2021), was also favorably received. The results indicated that the students displayed positive opinions of this learning dynamic and, perhaps most importantly, that it allowed them to learn to improve their own work. According to Stančić (2021), assessment for learning is not common in practice, although it does report benefits such as understanding the criteria behind high-quality work and learning outcomes, as well as practicing self-reflection and promoting self-regulation. In spirit, the proposed learning dynamic followed these guidelines because the activity did not affect grades. In addition, the students had the support of a rubric when carrying out the activity, and so could put their skills into practice to give feedback (Misiejuk et al., 2021)—of particular importance in a subject aimed at future foreign language teachers.

The present research paper is subject to one key limitation, which will now be examined. Wheres the intervention was positive in all the dimensions explored, it is possible that the differences between the final performance of the students who had made use of the available digital tools, and those who had not, are not completely attributable to the use of technology. According to Camacho-Miñano and Del Campo (2013), students with high intrinsic motivation are those who tend to perform voluntary tasks and achieve better academic performance, in general, making motivation a variable that would need to be controlled in order to achieve accurate interpretations of the results.

That said, it has to be highlighted that the findings of this study clearly show the positive impact of CMLC in the participants in this educational innovation project. As future educators, they have put in practice competences which they, in turn, will wish their own students to develop. The results of this study provide interesting insights into student satisfaction, academic performance and the perceived significance of digital tools in foreign language teaching and learning. In terms of student satisfaction, the majority of participants have a positive perception of the course experience, with particular emphasis on the quality of teaching and learning in digital contexts. As for the significance of CMLC, the results have shown significant differences between the students who made use of digital tools and those who did not. Finally, the participants' digital learning seems to have influenced positively their experience with other aspects of the teaching and learning process, such as "good teaching," "clear goals and objectives," and "appropriate assessment," showing the benefits of integrating digital technologies as part of future teachers' educational programmes. Not only it can have a positive impact on the academic grades of these future educators while they still are student-teachers, it also yields very encouraging results that confirm the close relationship between online learning, or digital learning, and high-quality university teaching. It is hoped that the favorable results of this innovative proposal will consolidate and the use of digital technologies in collaborative work and peer assessment will gain a broader adoption in language teacher training because it will result in enriching the learning experience of these future language teachers.

Information on Informed Consent or any Data Privacy Statements

Conflict of Interest

The authors declare no conflict of interests

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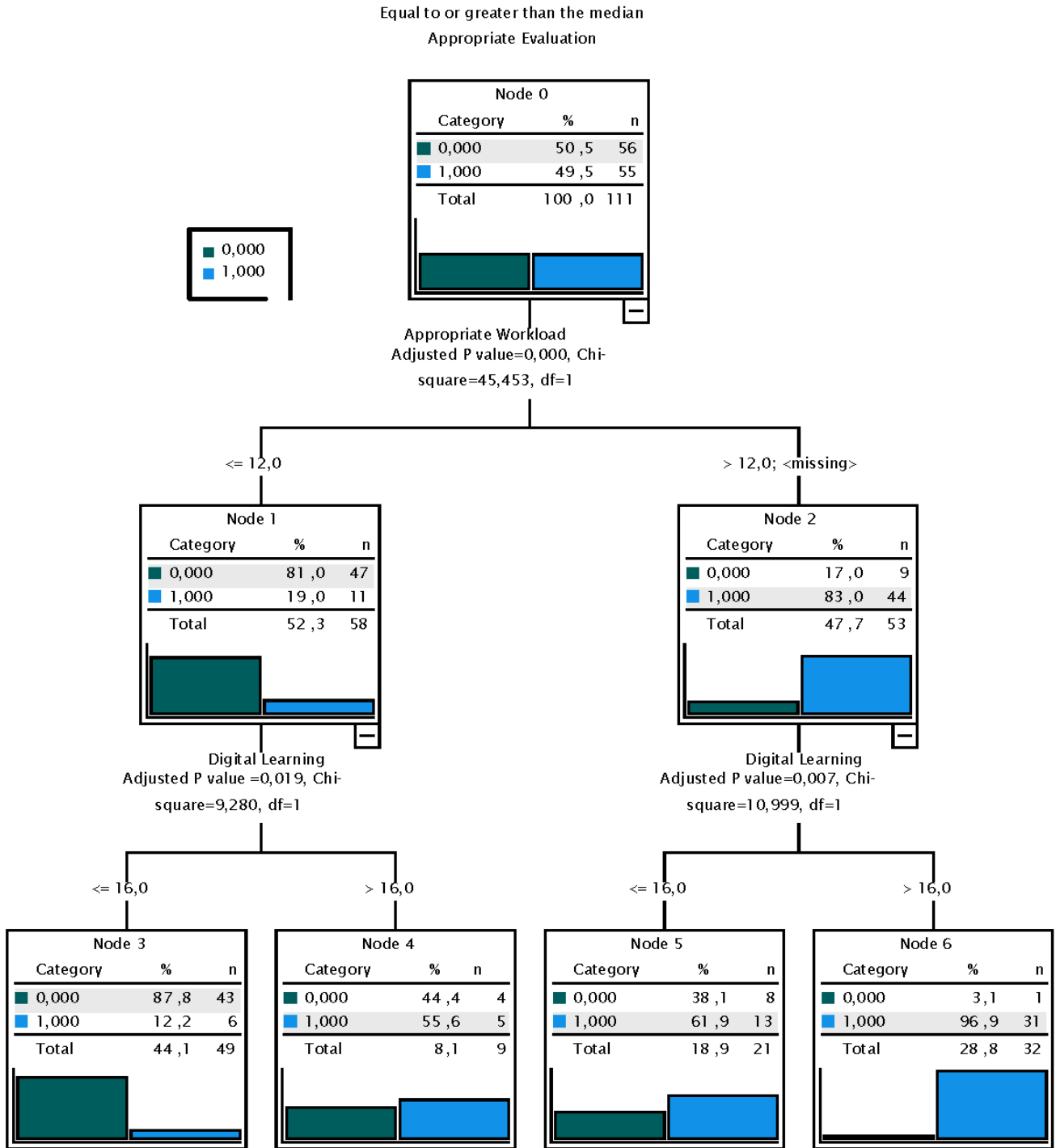
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Appendices

Appendices follow on the next page.

Appendix A

Classification Tree for the Dependent Variable "Appropriate Evaluation"

Equal to or greater than the median
Appropriate Evaluation

Node 0		
Category	%	n
■ 0,000	50,5	56
■ 1,000	49,5	55
Total	100,0	111

Legend: ■ 0,000 ■ 1,000

Appropriate Workload
Adjusted P value=0,000, Chi-square=45,453, df=1

<= 12,0

Node 1		
Category	%	n
■ 0,000	81,0	47
■ 1,000	19,0	11
Total	52,3	58

> 12,0; <missing>

Node 2		
Category	%	n
■ 0,000	17,0	9
■ 1,000	83,0	44
Total	47,7	53

Digital Learning
Adjusted P value =0,019, Chi-square=9,280, df=1

Digital Learning
Adjusted P value=0,007, Chi-square=10,999, df=1

<= 16,0

Node 3		
Category	%	n
■ 0,000	87,8	43
■ 1,000	12,2	6
Total	44,1	49

> 16,0

Node 4		
Category	%	n
■ 0,000	44,4	4
■ 1,000	55,6	5
Total	8,1	9

<= 16,0

Node 5		
Category	%	n
■ 0,000	38,1	8
■ 1,000	61,9	13
Total	18,9	21

> 16,0

Node 6		
Category	%	n
■ 0,000	3,1	1
■ 1,000	96,9	31
Total	28,8	32

Appendix B

Classification Tree for the Dependent Variable "Clear Goals and Objectives"

Equal to or greater than the median
Clear Goals and Objectives

Node 0

Category	%	n
■ 0,000	45,9	51
■ 1,000	54,1	60
Total	100,0	111

■ 0,000
■ 1,000

Good Teaching
Adjusted P value=0,000, Chi-square=61,504, df=2

<= 12,0

Node 1

Category	%	n
■ 0,000	93,5	29
■ 1,000	6,5	2
Total	27,9	31

(12,0, 15,0]

Node 2

Category	%	n
■ 0,000	65,4	17
■ 1,000	34,6	9
Total	23,4	26

> 15,0; <missing>

Node 3

Category	%	n
■ 0,000	9,3	5
■ 1,000	90,7	49
Total	48,6	54

Appropriate Evaluation
Adjusted P value=0,043, Chi-square=8,908, df=1

Digital Learning
Adjusted P value=0,019, Chi-square=8,390, df=1

<= 12,0; <missing>

Node 4

Category	%	n
■ 0,000	100,0	25
■ 1,000	0,0	0
Total	22,5	25

> 12,0

Node 5

Category	%	n
■ 0,000	66,7	4
■ 1,000	33,3	2
Total	5,4	6

<= 16,0

Node 6

Category	%	n
■ 0,000	28,6	4
■ 1,000	71,4	10
Total	12,6	14

> 16,0

Node 7

Category	%	n
■ 0,000	2,5	1
■ 1,000	97,5	39
Total	36,0	40