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Stepping into the integration of digital literacy in the CLIL approach

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Abstract

This article explores the pedagogical effectiveness of implementing digital literacy in a CLIL program. This investigation was conducted in a bilingual high school located in Southern Tenerife (Canary Islands, Spain). An action research investigation was developed with a group (n= 30) in the third grade of Compulsory Secondary Education. A learning intervention was designed and implemented in the discipline of Social Science belonging to a CLIL program, and digital literacy was also included in the pedagogical instruction. The results obtained demonstrate that learners' utilization of digital tools does not necessarily mean digital literacy development; the treatment and guidance of digital learning can be integrated within the CLIL approach resulting in positive outcomes when the CLIL approach is combined with project-based and cooperative learning.

Keywords: CLIL; cooperative learning; digital literacy; ICT; project-based learning

1. Introduction

Digital tools have become more relevant than ever due to their utilization for a great variety of reasons: communication and collaboration between individuals who are not sharing location, time, space; information searching and publication; creation of new content; and artistic production, among the most relevant activities. Digitalization, then, corresponds to an essential competence that individuals are required to develop nowadays, especially after the COVID-19 pandemic experience. During lockdown, digital tools were the single mechanism utilized by many to work, study, keep in touch with relatives, and even experience some hobbies. Similarly, English has become a *lingua franca* (Berns, 2009; Greer, 2016; Suzina, 2021), i.e., a medium of communication between individuals who do not share a common language. This mediation role adopted by the English language can also be observed in digital tools: both language and digitalization can be conceptualized as tools for communication, information searching and sharing, and gaining access to new contexts and cultural environments. This connection between language and digitalization highlights the relevance of integrating and exploring them together.

1.1. CLIL and digitalization

Content and Language Integrated Learning (CLIL), as a dual-focused learning approach (Coyle, Hood, and Marsh, 2010) implies a new paradigm in the teaching and learning environment, and different pedagogical activities and tasks. Language and content integration requires language and content instructors' cooperation and collaboration for the effective implementation of CLIL pedagogical methodologies in classrooms. In this paradigm, the foreign language is learned not as an isolated subject or as a goal, but as a medium of instruction for learning contents from different subjects in the curricula (Pavón, 2014; Cimermanová, 2017; Porcedda & González Martínez, 2020).

Literature connected to CLIL and digital tools confirms the great impact on learning when digitalization and CLIL are integrated. The utilization of a language in

new, digital contexts can foster new forms of language production and comprehension; digital tools in the CLIL classroom can also increase foreign language production and language contextualization. Parallel studies situate the use of technology in CLIL contexts as a reduction of workload and development of pupils' autonomy, fostering peer-learning (Marsh, Pavón and Frigols, 2013). Peer-learning is one of the main aspects contributing to the socio-constructivist perspective of the teaching and learning process in current conception. In similar studies, ICT inclusion in the CLIL approach contributes to the development of constructivist methodologies, pupils' autonomy and peer learning (Espinar & García; 2016) and generates opportunities for individualization and differentiation in the learning process (Siepmann & Pérez Cañado, 2022). Thus, CLIL becomes a much more accessible teaching and learning system. In fact, studies (Moreno- De Dierzmas, 2018; Moreno- De Diezmas, 2021) have suggested that the integration of ICT tools in CLIL environments has reduced pupils' difficulties in learning through a foreign language. Multiple intelligences can also be approached in the CLIL classroom by implementing ICT tools since they provide assistance for the assimilation of concepts in the foreign language and the resolution of language difficulties and conflicts (Morilla-García, 2017).

The pedagogical paradigm of CLIL can be adopted as a pedagogical reference for integrating foreign language learning and content learning (by means of the foreign language). In fact, there are multiple benefits to including foreign language, content and digitalization, indicating that the research line associated with digitalized CLIL needs to be continued so as to analyze and put into practice digital literacies in depth in the CLIL classroom.

1.2. The Digital Competence Framework for Educators

Digital competence has been adequately defined as the set of knowledge, skills, attitudes, abilities, strategies and values required when ICT is used for different purposes, such as information treatment and knowledge construction, communication, leisure, and so on (Ferrari, 2012). This definition of digital competence highlights the complexity of digital literacy due to the great variety of

activities that can be developed digitally and, especially, the fast development of ICT. The Digital Competence Framework for Educators, published in 2017, represents a systematization of digital literacy for educational purposes, defining areas, categories and level categories of digital knowledge, skills, abilities and attitudes. This framework consists of six areas:

1) Professional engagement. This category includes exploring different digital options, expanding, enhancing, renewing and innovating professional training.

2) Digital resources. This includes exploring digital resources, fitting digital sources to the learning context, strategic use of interactive resources and promotion of the use of digital resources.

3) Teaching and learning. This category deals with exploring digital teaching and learning strategies, integration and enhancement of digital technologies and learning activities, and renewing teaching practices according to these actions.

4) Assessment. This is associated with exploring digital assessment strategies, enhancing traditional assessment approaches, strategic and effective use, reflection and innovation of digital assessment.

5) Empowering learners. This category includes exploring learner-centered strategies, strategic use of a range of tools to empower, holistic empowerment and innovation of learners' involvement.

6) Facilitating learners' digital competence. This refers to encouraging learners to use digital technologies, implementing activities to develop learners' digital competence, strategic and critical fostering of learners' digital competence and use of innovative formats to do this.

These categories are interconnected due to their focus on online information, data literacy and treatment of online information. The differences among categories are associated with strategies and skills depending on the digital

activities approached. In this sense, there is a logic of interdependence among these categories: the development of one category requires the development of the others. Guitert et al., (2019) have catalogued this framework as a supportive tool for schools and teachers to integrate the complexity of digital literacy in the classroom and include the adaptations required. In fact, digital competence and its associated sub-competencies can be perceived as a key starting point for enhancing and expanding other competences (Lameras & Moumoutzis, 2021) and their isolated treatment is not recommended. They should rather be addressed as part of the organizational task and introduced within the school curriculum's contextual factors (Gran et al., 2019). For this reason, this study aims to include digital literacy in the integrated approach of CLIL.

1.3. CLIL and active methodologies

Learning content and language simultaneously implies a complex cognitive activity that requires appropriate pedagogical practices for an ideal approach. Prior research needs to be discussed and analyzed to identify methodologies that are better adapted to encouraging and engaging learners in the CLIL classroom. CLIL emphasizes learning by doing, with pupils' taking an active role. CLIL learners are characterized as autonomous, participative and interactive (Pérez Cañado, 2018).

The CLIL approach is currently being implemented through active methodologies, allowing for student-centered, communicative, and diverse learning (Pérez Cañado, 2018). This learning environment makes CLIL a flexible approach adapted to learners' characteristics, needs and interests. Cooperative learning also contributes positively to the development of the CLIL approach (Guazzieri, 2009; Pavón et al., 2015). In this sense, when considering methodologies for the teaching and learning process "student-centered methods like cooperative learning, task-based language teaching (TBLT), project-oriented work, curricular integration, or the lexical approach should all be part and parcel of CLIL programs" (Pérez Cañado, 2018, p. 372), as CLIL evolves from the simple phenomenon of

transmission of information to a discovery- based learning experience (Pavón & Rubio, 2010).

Project-based and cooperative learning are essential when designing a CLIL learning situation in order to contextualize the language and content, adapt them to learners, and promote discovery as mentioned in previous studies. Project-based and cooperative learning imply a multiperspective learning experience that includes language, content, procedures and peer learning. In this sense, these two methodologies can merge learning experiences that prioritize student-centered approaches.

2. METHODOLOGY

2.1. Objectives

The main goal of this research was to analyze whether digital literacy can be included in a CLIL context. Another objective is to ascertain the integration of project-based and cooperative learning, as well as the development of digital literacy in the CLIL classroom. Previous knowledge about the pupils' digital literacy was analyzed to determine their starting point.

2.2. Context

A case study was developed in a third grade class (n=30) of Compulsory Secondary Education (14-15 year olds) belonging to a high school in Southern Tenerife, Spain. These pupils have been in a bilingual educational program (CLIL) since the early stages of Primary Education. They have also participated in a digitalization educational program since fourth grade of Primary Education in which digital tools have been used for teaching and learning.

The high school in Southern Tenerife, situated in a semi-rural location, is composed of learners belonging to this area. Families are formed of middle- class members who do not have a great academic knowledge of English as a foreign language. This could pose problems when learners go home struggling with CLIL subjects as their family members do not have the required knowledge, skills, and

abilities to help their children. This has led to a rise in negative opinions about the CLIL approach in the high school. For this reason, this investigation was designed to conciliate families, pupils and the CLIL approach including a new element of learning: digitalization. In this model of research, a learning intervention was designed. This was implemented for three weeks (12 sessions in total) in the subject of Social Science. Each week consisted of four sessions of Geography and History according to the regional curriculum of the Canary Islands (Spain). The intervention was designed to incorporate criteria from the regional curriculum of Social Science, English as a Foreign Language and the sub-area of digital licenses which belongs to one of the areas of digital creation, which corresponds to one of the main categories of the Digital Competence Framework for Educators, namely, Digital Resources.

2.3. Research design

Participatory Action Research (PAR) was selected due to its reflection requirements, data collection methods and action towards improvement (Baum et al., 2006). In fact, PAR represents a complex system because of the different stages required: "PAR seeks to understand and improve the world by changing it." (Baum et al., 2006). This participatory methodology requires adequate materials and CLIL designed to make a change in a real-life situation in a specific CLIL community.

As previously mentioned, a learning intervention was designed. Criteria of different disciplines (Social Science and English as a Foreign Language) and the second area (Digital Resources) of the Digital Competence Framework for Educators were incorporated in the design of this learning intervention. Content creation was the main area of study, in particular the sub-area associated with digital licenses. This area was selected from the Digital Competence Framework for Educators (2017), as previously mentioned. The criterion of Social Science selected for this investigation refers to the study of the population regarding their contribution to the local and national economy, and distribution of the wealth. In the case of English as a Foreign Language, the criterion used in this learning

intervention refers to mediation activities. These criteria (from Social Science and English as a Foreign Language) were selected from the Decree Law 30/2023, of 16th March, by which the order and curriculum of Compulsory Secondary Education and Bachillerato in the Community of the Canary Islands is established.

2.4. Instruments

Qualitative and quantitative data were collected following a mixed methods approach (Onwuegbuzie & Leech, 2005). In this sense, an exploratory study was developed that aimed to analyze quantitative data complemented with the qualitative data obtained. Different instruments of data collection were developed:

1) Previous knowledge test. The main aim was to analyze learners' previous knowledge regarding digitalization.

2) Self-assessment rubric. This rubric was used to make pupils reflect on how and to what extent they learned about language, content and digitalization.

3) Peer-assessment rubric. This rubric aimed to analyze the learners' learning process with others by means of cooperative and interdependent practices.

4) Hetero-assessment. This rubric was a formative assessment developed by the teacher that aims to analyze what learners learned.

5) Survey test. The survey was administered to the students to evaluate the degree of complexity of the study they experienced.

6) Field diary. This instrument was used during the implementation of the learning intervention in order to obtain qualitative information about the intervention.

7) Cronbach alpha instrument. This instrument was included to analyze the degree of reliability of the results obtained.

3. Results

This study contains results of previous knowledge and formative and summative assessment. Special attention was given to pupils' previous knowledge of digitalization because they have been using digital tools for learning purposes since Primary Education. In this sense, the previous knowledge test conducted dealt with pupils' ideas about the different digital licenses. Furthermore, great importance was given to summative assessment with the main aim to compare the results obtained between summative and formative assessments

3.1. Previous knowledge test

As stated earlier, a previous knowledge test was designed to analyze students' previous knowledge regarding digitalization. The area of digitalization focused on in this investigation was associated with the creation of digital content, which includes a wide range of knowledge, skills, abilities, and attitudes. Thus, the aspect of the protection of digital products, specifically, digital licenses, was selected for the design of teaching and learning processes in this investigation. In fact, the previous knowledge test contained questions related to the different digital licenses utilized nowadays. The figures below have been selected to exemplify students' previous knowledge of digital licenses.

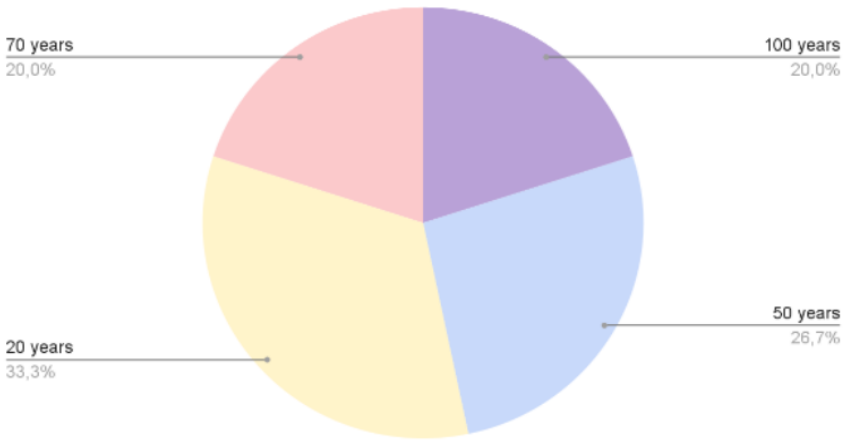

Figure 1. Question about the duration of a copyright license

Knowledge regarding copyright license is considerably relevant when using original sources due to the limitations and special requirements for utilization when the period of protection has not finished. This result suggests that most learners do not have the correct knowledge associated with the utilization and application of a copyright license, as only a small percentage (20%) have the correct understanding of a copyright license.

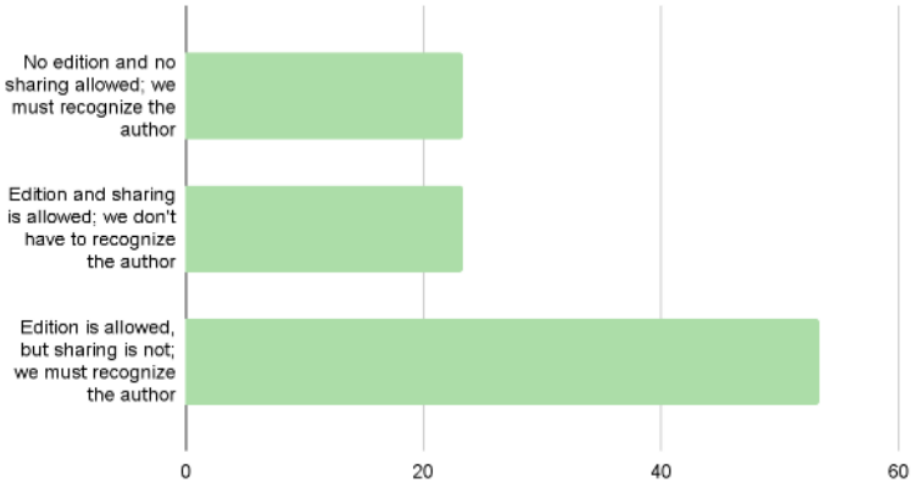

Figure 2. Question about the features of a copyleft license

As indicated in the title of Figure 2, the main objective was to assess learners' ideas about the main features of a copyleft license. Only 23,5% selected the correct answer, i.e., "edition and sharing are allowed; we don't have to recognize the author." This result demonstrates that the majority of learners do not have accurate knowledge about copyleft licenses (and copyright licenses according to the previous figure), and this could provoke a misapplication of digital licenses or even incorrect protection when applying digital licenses to their own digital products.

3.2. Summative assessment

This investigation aimed to analyze students' process and degree of learning through a deep reflection on how they learned. In fact, rubrics for self and peer assessment were designed to make learners think about their own processes of learning and what and how they learned from their classmates. Rubrics were

designed according to four levels of (dis)agreement (according to their level of learning). Number 1 represents "totally disagree"; 2 "partially disagree"; 3 "partially agree"; and 4 "totally agree." The self-assessment rubric was composed of language, content, and digitalization aspects. Self-assessment results were analyzed regarding reliability. In order to do so, the Cronbach alpha instrument was implemented. The value obtained was 0,87, indicating a considerable level of reliability.

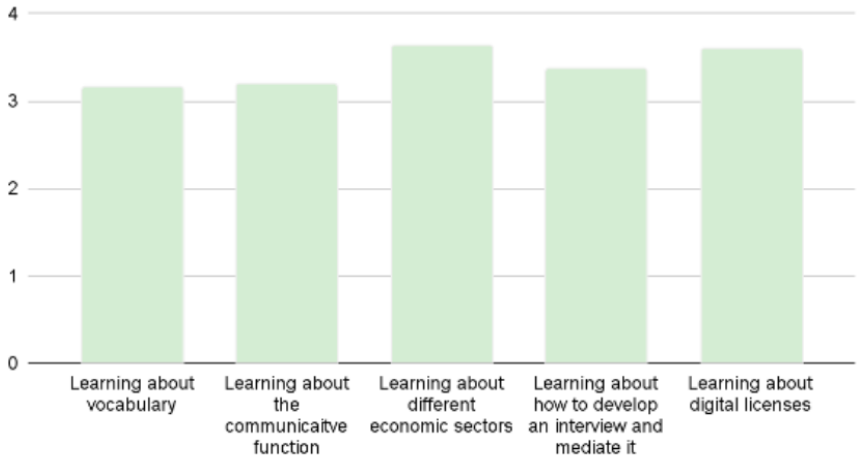

Figure 3. Self-assessment arithmetic averages

The arithmetic averages of Figure 3 are all above value 3. This means that the design and implementation of a new element in the CLIL context did not affect the learning process of language and content aspects. In fact, the different parameters are balanced, which could be observed as a positive application of the digitalization of the CLIL approach. Among the most positive aspects, learning about the different economic sectors and learning about digital licenses were the parameters with the highest scores. The former result implies that the inclusion of a new element in the CLIL approach (digitalization) did not affect the learning process of subject content.

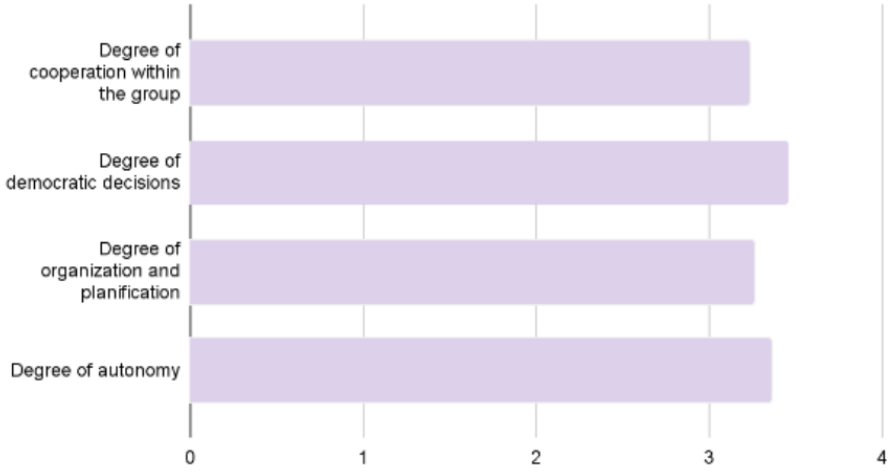

Figure 4. Peer assessment arithmetic averages

A peer assessment was designed to analyze students' degree of learning of cooperative values such as democratic values and decisions, degree of organization and planning within the group, independence and cooperation within the group. Alpha of Cronbach was used to evaluate the reliability of these results and the value obtained was 0,82. This indicates that the values can be considered as reliable. As observed in the previous rubric, the results are balanced according to the parameters that compose cooperative learning. The degree of democratic decisions and autonomy are the parameters with the highest scores, signifying positive results obtained from applying cooperative methodologies in this CLIL study about digitalization.

3.3. Formative assessment

Formative assessment was included to compare students' reflections on what and how they learned. Formative assessment was developed by means of a rubric which contained criteria for language, content and digitalization. As specified on previous rubrics, the system of assessment remained the same, with values ranging from 1 to 4, indicating the degree of pupils' learning, from "completely disagree" to "completely agree". Hetero-assessment reliability values (0,88) are consistent to consider these data valid.

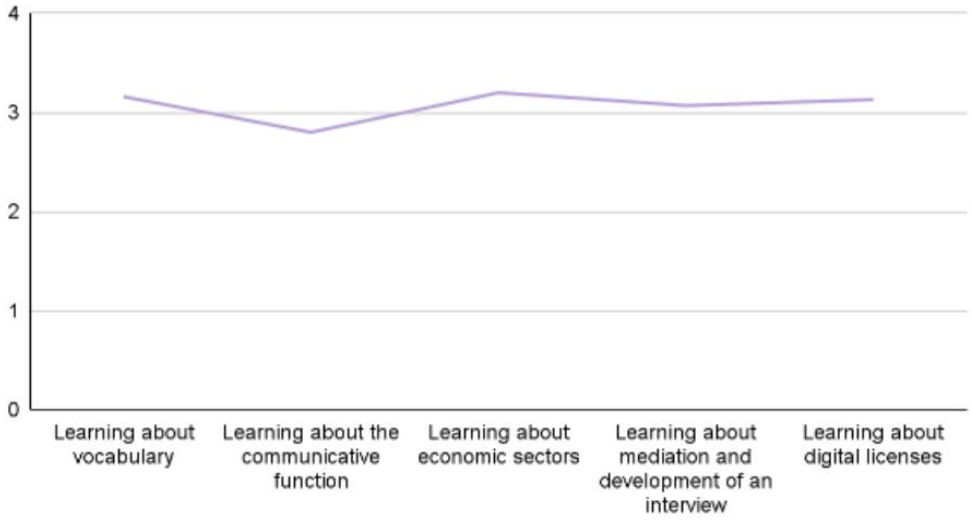

Figure 5. Hetero- assessment arithmetic averages

Hetero-assessment results suggest a positive approach to teaching and learning in terms of content, language and digitalization in a CLIL context. The results are generally balanced, although one result "learning about the communicative function" was lower (2,89) than 3. This result can be understood in the context of the teacher's exercise of self-criticism observed in the field diary. The teacher stated that the communicative function was very vast, so its introduction should have been reduced to foster better understanding and application. The remaining results were positive and balanced, as observed in the analysis of summative assessment. This sense of agreement reached between hetero-assessment and summative assessment does not only imply students' rational and adequate procedure in the cognitive activity of self-reflection regarding learning and cooperative practices, but it also suggests the digitalization of CLIL is possible and the inclusion of a new parameter does not necessarily affect language and content learning.

3.4. Survey test

A survey test was eventually conducted as part of the investigation to analyze pupils' degree of satisfaction regarding the inclusion of digitalization in a CLIL subject. The survey test was designed to make pupils reflect on and criticize the

design of the learning intervention including goals, the degree of complexity of the final product, how the language, content and digitalization were introduced and developed within the classroom, and the inclusion of cooperative learning, among the most relevant parameters. The validity value of the survey test represents 0,90, indicating its validity for the investigation. The values of analysis were repeated: values 1 to 4, representing "completely disagree" to "completely agree."

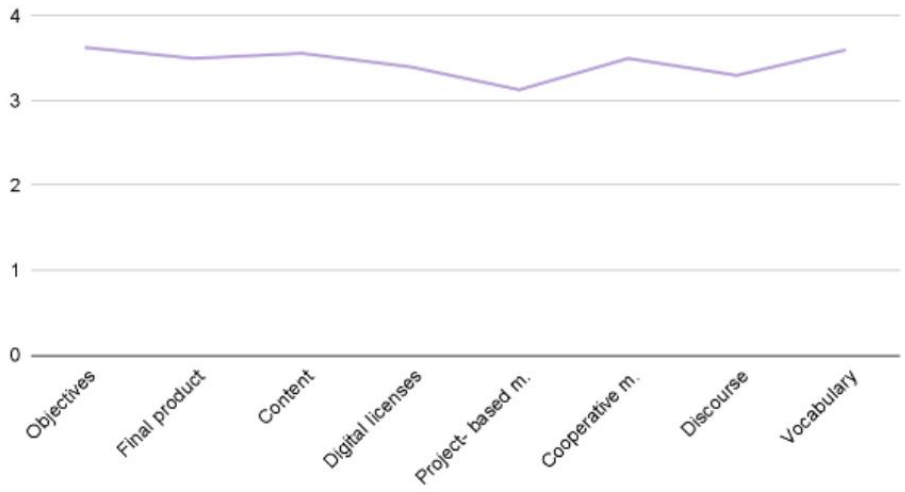

Figure 6. Survey test arithmetic averages

The elements with the lowest scores are associated with project-based learning and the discourse selected for the learning situation. The complexity of PBL was a challenge for learners during the development of the final product and adjustments and adaptations may be needed when this investigation is applied again. The second parameter mentioned was also analyzed in the hetero-assessment process. The communicative function selected for learning might have been complicated for pupils and may require revisions for better learning. However, all parameters are above 3, which indicate that the investigation was adequately designed and applied according to learners' cognitive/maturity level, foreign language and content levels.

4. Conclusions

According to the results obtained in the previous knowledge test, the systematic implementation of digital devices in an educational context does not

imply digital learning as a result. A conscious and guided process about digitalization is required if students are expected to acquire knowledge, abilities and skills associated with it. The inclusion of digital tools in the classroom is not enough for the development of the digital competence: its conscious treatment is essential for effective digitalization learning.

Moreover, positive results in the rubric and test survey indicate high effectiveness in the implementation of digitalization in CLIL. As demonstrated in previous studies (Pavón et al., 2015), a low proficiency level in CLIL is not a handicap when the pedagogical strategies are correctly applied in the CLIL approach. This statement can be extrapolated to the inclusion of digitalization in the CLIL approach. When positive methodologies are applied to CLIL such as cooperative learning (Martínez, 2011; Martucci, 2015; Ramos Ordoñez & Pavón, 2015) and project-based learning (Díaz Pérez et al., 2018; Sánchez García & Pavón, 2021), a positive teaching and learning process can be reached.

This study has not only demonstrated positive results in the CLIL approach and its combination with digitalization, but it has also connected learners, families and school within the CLIL context. By involving family members in learners' interviews, families have been able to participate in and be part of the CLIL experience. In this sense, this study aims to bridge the gap between pupils' formal and informal contexts and make the families part of the CLIL approach. By doing so, families may overcome prejudices and misconceptions about CLIL.

Certain limitations have been identified in this study. The target group is small and these results cannot be generalized. Further research needs to be addressed so as to determine actual effectiveness in the inclusion of digitalization in the CLIL approach.

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