The Integration of the Digital Platform *Educaplay* in Interdisciplinary Paths in the 1st and 2nd Basic Education Cycles

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The dialogue between knowledge, pedagogies and didactic resources gives meaning to learning. This learning when integrated in a transdisciplinary environment enhances the holistic development of the child. This study is part of the Master's Degree in Education of the 1st Cycle of Basic Education and Portuguese and History and Geography of Portugal in the 2nd Cycle of Basic Education, integrated in the IFITIC Project "Innovate with ICT in Initial Teacher Training to Promote Methodological Renewal in Pre-school Education and in the 1st Cycle of Basic Education". The purpose of this research is to verify the potential of the digital educational platform *Educaplay* in the 1st and 2nd Basic Education Cycles. In this sense, the qualitative methodology was used, of an interpretative and comprehensive nature, since the aim is to analyze the social, valuing the meaning of action and the role of the subjects in the social construction of reality. The data were collected by the participating observation practice and field notes, since they allow access to facts, situations and behaviors, difficult to be captured through the survey or interview. In the first stage the educational practice was understood through the integration of digital resources and in the second stage the facts and their impacts were analyzed and interpreted. The sample involved 73 children, 21 children attending 3rd grade and 52 children from two classes attending 6th grade at a school in the Porto region. The results show that this platform has promoted: a) the appropriation of contents in a transversal and interdisciplinary way and b) the development of skills, values and attitudes inherent to the profile of the XXI century student. Thus, the article presents the educational practices that have integrated tools of *Educaplay* by the voice of the narrator. It is hoped that this research can provide pointers for teachers and educators seeking to renew their educational practices of vertical and horizontal articulation.

Keywords: digital platform *Educaplay*, vertical articulation, horizontal articulation, participant observation, field notes

Introduction

The design of interdisciplinary teaching paths by the teacher requires a combination of knowledge, pedagogy and teaching resources to enhance student learning. In turn, it implies a renewal of educational practices (Quadros-Flores & Raposo-Rivas, 2017) and an initial training of quality teachers that accompanies the metamorphosis of the school and creates new environments for professional

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teaching training (Nóvoa, 2019). Stimulating interaction between theory and practice, responding to a plural and flexible teacher profile, capable of articulating knowledge between the various areas of knowledge (horizontal articulation) and between years of schooling (vertical articulation) responding to the interests of today's young people is a challenge that reaches us.

In this sense, this article is part of the Supervised Educational Practice (SEP) contemplated in the Master's Degree Course in Teaching at the 1st Cycle of Basic Education and Portuguese and History and Geography of Portugal at the 2nd Cycle of Basic Education.

The formative model adopted at SEP sought to stimulate, among teachers in initial training, practices in which the integration of knowledge between areas of specialization and teaching cycles was promoted, respecting the specificities of each area, in a permanent "shuttle" process that leads to future changes (Oliveira & Serrazina, 2002; Graça, 2018).

In this context, the trainee student has developed didactic paths promoting vertical and horizontal articulation, namely in the 1st Cycle of Basic Education and 2nd Cycle of Education, in the specialties of Portuguese and History and Geography of Portugal, using the digital platform *Educaplay*.

Literature Review

Nowadays, we are witnessing fast and constant transformations in society and the area of education was no exception.

According to Nóvoa (2019), we are witnessing strong transformations and it is imperative "to reconstruct the environments, always having an orientation that the place of formation is the place of the profession" (p. 7). This reconstruction passes, in its perspective, by the components it presents in the triangle of teacher training (Figure 1).

Figure 1. Formation Triangle (translated)
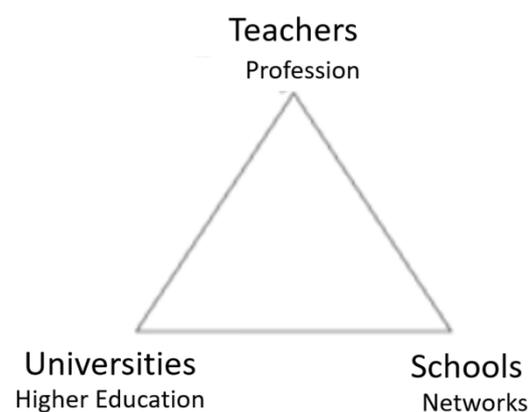
Source: Nóvoa (2019).

In this way, the author intends to reinforce the idea that initial teacher training should link these three sides, where universities together with the network of

schools should create environments for quality teacher training and prepared for the challenges of today. The experiential knowledge built in the internship centers express decision making and autonomy capabilities, finding solutions for emerging situations of practice, know-how, know how to be fundamental in teaching professionalism. This possibility of feeling the complexity of reality is fundamental for the future teacher, because it promotes the construction of a professional who acquires and develops knowledge from practice and in confrontation with the conditions of the profession.

In this sense, it fosters the training of teachers as agents of transformation, of the production of specific knowledge of the profession. Even in adverse contexts and in situations of surprise and uncertainty, it is in the interaction with the context and its actors that the specific know-how of the teaching profession is built.

It is in this context that the Supervised Educational Practice of the 1st Cycle of Basic Education and Portuguese and History and Geography of Portugal of the 2nd Cycle of Basic Education is framed, whose formative model is based on the development of vertical and horizontal articulation educational practices, promoting the articulation and integration of knowledge between the areas of specialty and teaching cycles, respecting the specificities of each area and enriching the contexts by the positive influence of the contexts of intervention with didactic practices and knowledge leading to the profile of the multifaceted teacher (Oliveira & Serrazina, 2002; Graça, 2018).

The vertical articulation aims to improve the coherence of studies in a disciplinary area of a given cycle or level of education, while the horizontal articulation promotes the development of the interrelationship between the various disciplines or disciplinary areas (Tanner & Tanner, 1980; Gimeno, 1996; Pacheco, 2001; Morgado & Tomaz, 2010). Three concepts emerge linked to the articulation of knowledge: 1) multidisciplinarity or multidisciplinarity; 2) interdisciplinarity; 3) transdisciplinarity. Regarding the first concept, it refers to the relationships between the disciplines and the fragmented curriculum (Leite, 2012). From the author's perspective, interdisciplinarity refers to the creation of a group of disciplines that interrelate in a global and holistic vision. Transdisciplinarity, in its perspective, articulates contextually and curricularly, allows exploring the contents that underlie the disciplinary areas in meaningful way for the student, facilitating the interpretation and understanding of reality. Also the legal documents of the Directorate General of Education reinforce the curricular articulation and educational continuity, and allow the formation of a double profile teacher, as referred to in the Decree-Law no. 43/2007[1], of February 22nd.

It is thus allowed the mobility of teachers between levels of education with a deep look between them, which can facilitate the transition of the student through practices and educational projects more focused and continued. These curricular organization dimensions are present in Bruner's (2001) spiral curriculum concept.

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[1]Decreto-Lei nº 43/2007 de 22 de fevereiro. Diário da República n.o 38 – I Série. Ministério da Educação (Official Gazette No 38 - Series I. Ministry of Education). Lisbon. Regime jurídico da habilitação profissional para a docência na educação pré-escolar e nos ensinos básico e secundário (Legal regime of professional habilitation for pre-school education and our basic and secondary education institutes).

In the author's line of thought, this type of curriculum has an interactive nature in the ways of building/reconstructing knowledge, and as the topics and concepts are assimilated, the increasing levels of difficulty and complexity of learning increase. Teaching and learning units were then created that related programmatic contents between teaching cycles and disciplinary areas.

It was necessary to reorganize the teaching and learning process, outlining interdisciplinary teaching paths that integrate digital technologies. In Moran's (2004) view, it is important that students be more motivated, have more initiative, explore new possibilities. And the technologies can be an excellent help in the task of developing this more enterprising and innovative student.

Several studies refer to the potential of ICT in the teaching and learning process as a pedagogical tool in the appropriation of knowledge and development of skills, but also in stimulating the involvement and enthusiasm of students in learning (Batista, Pires, Brito, & Rodrigues, 2017;); as a resource for greater consolidation of teaching/learning (Gonçalves, 2012); or in the promotion of new ways of learning, teaching and thinking (Gândara, 2013). They also contribute to the learning of several areas of knowledge, such as Mathematics, where students used the computer and the Internet to learn (Viseu, Lima, & Fernandes, 2013; Ribeiro, Sant'Ana, & Sant'Ana, 2021); in Portuguese, where was a promoter of multilements (Ottoni & Silva, 2017); in History, through the use of Web 2.0 tools (Cruz, 2009) with the use of the technological tool Nearpod (Caetano & Nascimento, 2019); in Geography learning (Simões, 2020). Clearly that technology alone does not guarantee educational success, it is supported by methodological changes that are important for good student performance (Quadros-Flores & Ramos, 2016; Raposo-Rivas et al., 2020) and the use of cognitive tools that develop complex thinking in the student (Jonassen, 2007).

From the author's perspective, cognitive tools are "computer applications that require students to think significantly in order to use the application to present what they know" (p. 15). It advocates that the use of these tools enhances peer cooperation, active participation, knowledge building and student learning.

Its use of the tool, inserted in the theoretical framework of constructivist learning, contributes to the process of teaching and learning, motivating motivatin students and stimulating skills, abilities and attitudes inherent to the *Profile of the Student leaving Compulsory School,* participation, motivation, previous knowledge, intuition, reasoning and problem solving, autonomy, curiosity, empathy, group identity, interaction, information and communication, critical and creative thinking, cooperation, collaboration, argumentation (Oliveira-Martins et al., 2017).

It is in this context that the use of the *Educaplay* digital platform emerges in the design of interdisciplinary paths in the 1st and 2nd Cycles of Basic Education. This platform enables the creation of online educational activities (Salazar, 2014).

In the vision of López (2012) an educational platform is a virtual environment that facilitates the creation of training activities through the network, integrating different basic tools in the same interface, so that users can carry out all the activities of the training processes from the same environment. It effectively integrates tools that leverage a lot of features, such as crucigrams, multiple choice questions, letter soup and others (Table 1).

Table 1. Educaplay Platform Functionalities

Activity	Functionality(s)
1) Riddles	Find a word from a series of clues.
2) Crucigram	Complete a word, through clues that can be: written, sound or image.
3) Letter Soup	Find words in the soup of letters the words requested.
4) Complete texts	Add the missing words in a paragraph or sentence.
5) Dialogue	Cancel the audio of one or more characters so that the user can assume the role of that character. There are two playback modes: continuous playback and phrase by phrase playback.
6) Dictations	Write on the platform the text to be heard in the dictation.
7) Sort letters	Sort letters to form a word or phrase.
8) Linking elements	Review concepts by associating several words or images.
9) Create test questionnaire	Build questions adapted to the concepts you want to evaluate.
10) Vídeo*quiz*	Put questions on the video, you can resort to *Youtube*.

Source: Own authorship, based on Salazar (2014).

The platform also allows students to download activities in flash format to develop without an Internet connection and allows them to create their own activities (Salazar, 2014). But to have effective effects on student learning and skills, it is necessary to recreate and renew educational practices with new methodologies to give meaning to educational change (Quadros-Flores & Raposo-Rivas, 2017).

Methodology

In this study, a qualitative methodology was used. Qualitative research focuses on understanding the phenomena, exploring them from the perspective of the participants in a natural environment and in relation to their context (Sampieri, Collado, & Lucio, 2014). The following starting question was outlined: "What are the potentialities of the *Educaplay* digital platform in the development of knowledge, skills and attitudes of students, through interdisciplinary teaching paths?"

To answer the question presented, participant observation was used, by means of field notes collected by the trainee teacher (NC)[2]. This type of observation places the researcher as an active participant in the study, and for this reason he is considered by Denzin (1989) as "a deep dive in the field" (p. 142), and for this reason he records his data in a reconstructive, typifying and synthetic way, resulting in field notes. These field notes can be of two types: a) Descriptive, in which so precise and detailed descriptions of what is observed are made, such as physical appearance, as well as saying and acting; b) Reflexive, in which the

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[2](NC) Abbreviation for field note.

researcher makes speculations of expressions and feelings and creates ideas and impressions from the data he observes (Coutinho, 2011).

In the case of this study, descriptive and reflective field notes (FN) were used in order to investigate the potential of the *Educaplay* platform in the development of knowledge, skills and attitudes in the student using intedisciplinary teaching paths. The teacher developed the activities with the students and, when possible, took their field notes during the activities, however, some of the notes were written after the activities were finished. The trainee teachers designed strategies that integrated *Educaplay* in order to promote enthusiastic participation by the student during learning, both at the level of understanding and systematisation of the curricular content. The sample involved 73 children, 21 children attending the 3rd grade and 52 children from two classes attending the 6th grade of a school in the Porto region. Only the classroom computer was used and it was through this equipment that the activities on the platform were developed. In collaborative work, the students responded to the challenges proposed on the platform, and one student at a time wrote the group's response on the platform, thus developing digital, cooperation and collaboration skills. As a trainee teacher, her work was more intense in the preparation of the lesson, during the lesson they only responded to some problem because she was prepared in the sense of provoking an autonomous student profile.

For the analysis of the collected data the techniques of content analysis were used. It is a type of analysis that involves a set of techniques that enable the processing of the data collected, through the categorization that aims to differentiate and regroup elements according to defined criteria (Esteves, 2006). The categorization integrates two inverse processes: the procedure by "boxes", in which there is a pre-defined system of categories from the literature, or hypothetical theoretical functions, and they are best divided into the various elements that are found during the analysis; and the procedure by "mile", in which the categories of analysis are created as the data are analyzed, and therefore the title of each category is only defined at the end of the operation (Bardin, 1977). In the case of this analysis, the "mile" procedure was chosen, since the title of each category was defined at the end of the operation. From the data analysis two categories of analysis emerged: A) appropriation of contents in a transversal and interdisciplinary way; and B) the development of competencies, values and attitudes inherent to the profile of the XXI century student (Table 2).

Table 2. Analysis Categories

Analysis categories	Indicators
A) Appropriation of contents in a transversal and interdisciplinary way.	It refers to the construction and acquisition of curricular knowledge.
B) Development of skills, values and attitudes inherent to the profile of the XXI century student.	It refers to the development of personal and social skills (reasoning, problem solving, interpersonal relationship...), values and attitudes (freedom, responsibility, curiosity, participation...)

Source: Own authorship.

In the analysis and discussion of the data, the categories presented complement each other, and therefore throughout the text they will appear merged, since they were simultaneously in the various moments, because the students developed transversal knowledge and stimulated skills, values and attitudes.

Results & Discussion

We tried to understand the potential of the *Educaplay* digital platform in the development of knowledge, skills and attitudes in the student through interdisciplinary teaching paths. A summary table was built with the various functionalities of the platform used in some moments of these interdisciplinary courses and the skills developed with them (Table 3).

Table 3. Platform Functionalities and Developed Skills

| Year of schooling	Disciplinary Area	Execution	Skills developed
3rd year (1st Cycle of Basic Education)	Study of the Environment The soils and the rocks	Using an image discovery app, present in the digital platform, students find senses and meanings that define curricular contents.	- Search for opportunities for involvement and self-development - Mobilization of previous knowledge - Intuition - Reasoning and capacity of visualization - Autonomy and curiosity - Empathy - Group identity
6th year (class 1) (2nd Cycle of Basic Education)	Portuguese Poetry Poem "A força das palavras" (The Strength of Words) by Luísa Ducla Soares	In a large group, the students complete the gaps in the poem by clicking on the corresponding application labels.	- Implication and motivation for real-time interaction - Reasoning - Information and communication - Critical and creative thinking
	Portuguese Creative Writing Title of a news item on April 25, 1974	Each pair of students writes the title of their news in the *Educaplay* application. Confrontation of the titles placed in the application by the students with the real title of the news.	- Cooperation and collaboration - Critical and creative thinking - Intuition (preview) and curiosity - Motivation - Argumentation - Demostration of attitudes
6th year (class 2) (2nd Cycle of Basic Education)	History and Geography of Portugal Pool Activity	Realization of a game using the *Educaplay* technological application, in which the students associated cards with images and cards with phrases, referring to the theme worked.	- Orality skills - Knowledge assessment - Capacity of critical and argumentative reflection - Demonstration of values

Source: Own authorship.

In the didactic course about the types of soils and rocks, in the 3rd year of schooling, a learning unit of contextual and horizontal articulation was built, in which different components of the curriculum were interrelated: Study of the Environment, through the main concepts (soil, types of soils and rocks and their daily uses); Mathematics, through the resolution of problems about area, perimeter and fractions; Portuguese with the reading and understanding of the text "João e o Pé de Feijão" (John and the Beanstalk), by Laurent Richard.

One of the moments of the lesson was used the functionality of the digital platform *Educaplay* "Guess what", in which the students would have to discover through clues with images the theme of the lesson (Figure 2).

By using this feature, students developed skills such as mobilizing previous knowledge "the eyes of the students revealed a willingness to say what they knew about the subject to be addressed and therefore were not afraid to show their ideas" (FN), since the previous knowledge of the students and the articulation of curriculum give meaning to the experience and sustains new knowledge (Graça, Quadros-Flores, & Ramos, 2019). The discussion about the possible lesson topic took place in a large group, and one student at a time would move to the computer and post the group's answer on the platform until they arrived at the correct answer.

*Figure 2.* Using the "Riddle" Functionality
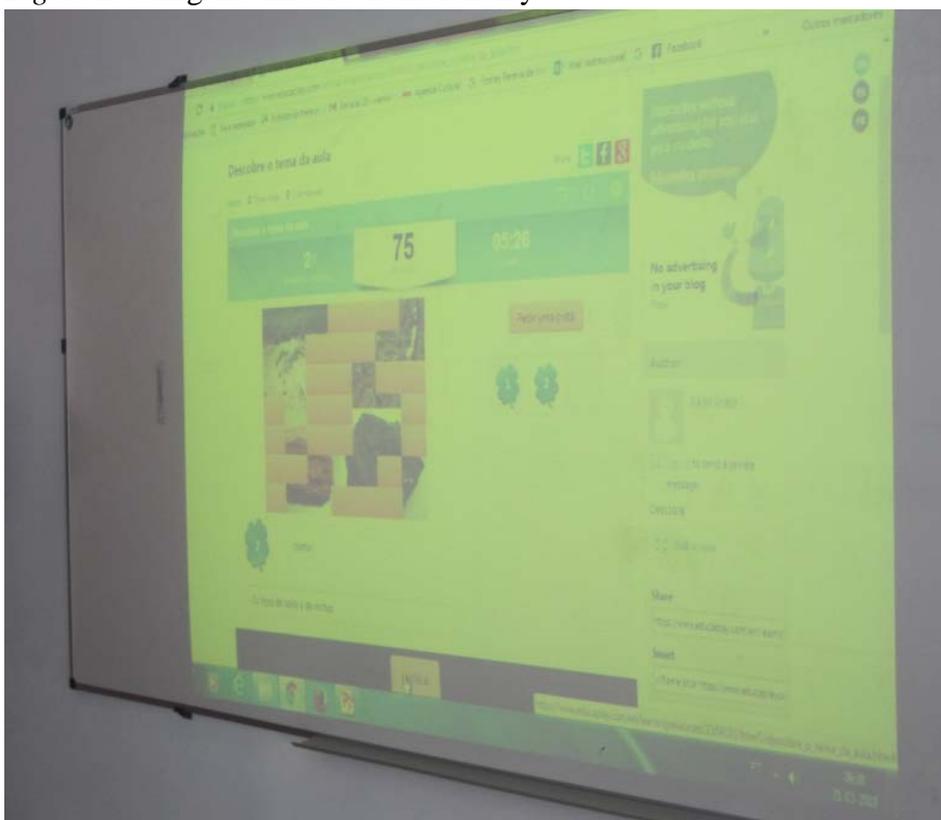
Source: Own authorship.

The reasoning and capacity of visualization, participation and motivation, intuition were promoted, since they were raising hypotheses about what the class theme could be, stimulating values and attitudes such as group identity "The students were excited to discover through the images the theme of the class. It was noticed that they didn't used to work in groups" (FN), the autonomy and curiosity "were so enthusiastic that they wanted to say their ideas and sometimes they got up from their place for that" (FN), the empathy. The platform integrated in an innovative teaching *design* favors the learning of curricular contents and the development of essential competences for the student, however, the organization of these learning paths implies, on the part of the teacher, a renewal of his educational practices (Quadros-Flores & Raposo-Rivas, 2017; Raposo-Rivas, Quadros-Flores, Martínez-Figueira, & Silva, 2019) and of innovative pedagogical, curricular management and technological solutions (Moran, 2004). Therefore, institutions of initial teacher training should promote, in supervised educational practice, the (re)construction of environments always bearing in mind the idea that the place of training is the place of the profession and the three faces of teacher training mentioned above (Nóvoa, 2019).

A didactic sequence of horizontal and vertical articulation was delineated between the 1st Cycle of Basic Education (Portuguese area, Study of the Media and Plastic Expression) and the 2nd Cycle of Basic Education (Portuguese area and History and Geography of Portugal), whose globalizing theme was the 25th April 1974.

In the didactic course for the 6th year of schooling, in the Portuguese area, with the theme of April 25, 1974, in which two classes were built. The first class explored the literary text "A Revolução das Letras" (The Revolution of Letters), of Vergílio Alberto Vieira, of the narrative type. In the second, the non-literary text, the news, was privileged, presenting to the students a news of the time about the 25th of April, working its understanding in the light of the programmatic contents of Portuguese and the historical facts of History. After her understanding, the teacher projected another piece of news, but with the title cut off, she prepared the students for creative writing. Each pair of students would have to write the title of their news, using the "Complete texts" feature of the *Educaplay* platform, taking into account the clues provided by the digital platform (Figure 3). Afterwards, there was the confrontation of the titles placed in the application by the students with the real title of the news. This practice allowed the application of previous knowledge, but also manifested the understanding of the content and creativity in the reconstruction serving as a basis for an eventual (re)creation of the text.

*Figure 3.* Using the "Complete Texts" Functionality
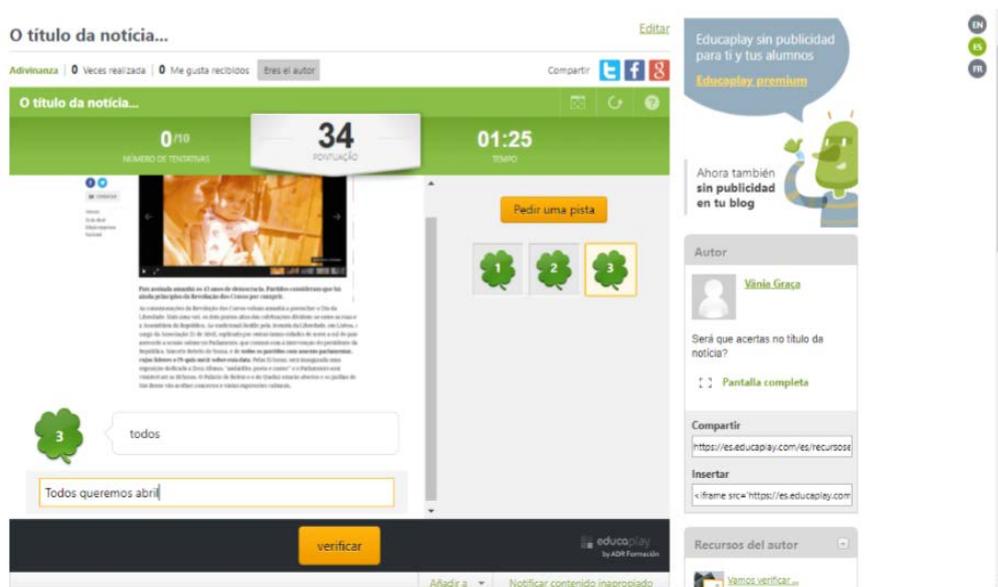
Source: Own authorship.

It should be noted that this creative writing activity developed students' skills of critical and creative thinking in an environment of cooperation among peers, initially of collaboration in large groups "The students were constantly creating new titles about the news, through the knowledge they had already built in previous classes, talking among peers and in large groups to try to get closer to the title" (FN). Therefore, it was verified that the students mobilized knowledge learned from other classes and disciplinary areas, in a transversal way, relating interdisciplinary knowledge. They developed their intuition and argumentation, both with the pair and in a large group. The teacher began to play the role of a guide in the construction of knowledge, as a "tool of the formative teacher" that mediates the construction of knowledge of his students (Castro & Zuin, 2018) and in which the student goes from consumer to constructor of knowledge "I was only the "spectator" and the students the "actors" because they self-regulated in their interventions, talking to each other in a respectful way, in such a way that I started only to mediate" (FN).

Another didactic path was developed in the 6th year of schooling, with the use of the same previous functionality, but with another pedagogical intention. The globalizing theme was the value of words, and for this, a didactic sequence of horizontal articulation of three classes was outlined. In the 2nd class it was intended to work the poetic text, with a look at word formation (prefixing and suffixing). To start the lesson, the poem "A força das palavras" (The Strength of Words) of Luísa Ducla Soares was projected, and the students would have to complete the gaps of the poem, clicking on the corresponding labels of the *Educaplay* application (Figure 4).

Figure 4. Using the "Complete Texts" Functionality
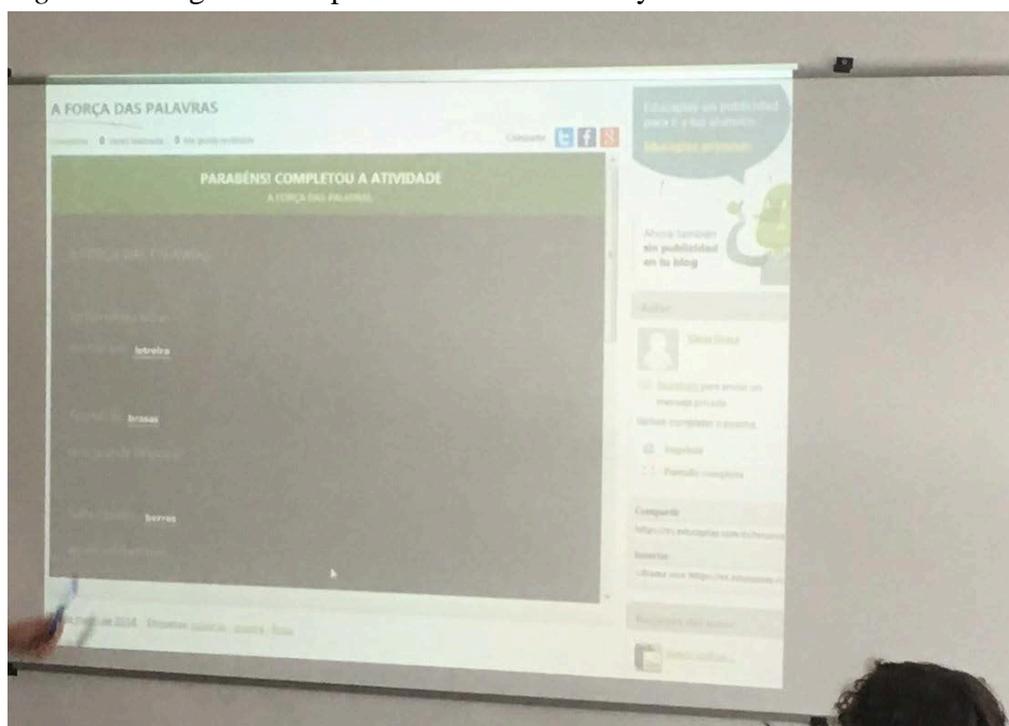
Source: Own authorship.

The use of this feature allowed the development of grammatical knowledge, in which it was important to make a path of understanding through dialogue with the students, using first a game from the individual to the collective, that is, from the unit to the whole, and then it was important to identify the concept of collective common name. In turn, the poem allowed the students to work on the rule of word formation, more specifically, making them identify the primitive word and the suffix of the word, for example, letter (primitive word) + eiro (suffix), ember (primitive word) + eiro (suffix). And for this reason, this platform helped the student in the construction of his knowledge (Rothman, 2013), we reinforced, in an intuitive and self-regulating way, also stimulating autonomy.

In addition, given the *Student Profile at the Exit from Compulsory School* (Oliveira-Martins et al., 2017), students also developed important skills such as critical and creative thinking, the reasoning "Students were able to quickly get to the words that were missing in the spaces, talked in large groups and discussed opinions, with great willingness to participate" (FN), so it motivated students and stimulated participation through interaction in real time. It is noteworthy that each learning acquires meaning when framed in an educational environment that involves students (Graça, Quadros-Flores & Ramos, 2019).

Finally, a didactic sequence of vertical articulation between the 1st and 2nd Cycles of Basic Education, Study of the Environment and History and Geography of Portugal, respectively, was built. The globalizing theme was the fishing activity. In the 2nd cycle, in the area of History and Geography of Portugal, as a way to consolidate knowledge, the functionality "Relate elements" was used, where

students would have to consolidate their knowledge by associating cards with images and cards with sentences (Figure 5).

Figure 5. Using the "Relate Elements" Functionality

Source: Own authorship.

With this activity, the students had actively and interactively evaluated their knowledge on the subject. "In this activity the students tested their knowledge and it was seen that they were motivated to prove that they knew how to respond. They were losing the shame of making mistakes and of speaking their opinion" (FN). This type of teaching and learning dynamics offers different options compared to lecture, through interactive games to develop disciplinary content by proposing more motivating activities for students (Castro & Zuin, 2018). The students have developed their critical and argumentative capacity, as well as their orality, which are fundamental to the formation of the citizen of tomorrow.

The students also demonstrated some values such as respect for others, cooperation and collaboration "The students respected their turn to intervene in the activity, as well as the responses of their colleagues, regardless of whether they knew they were wrong or not" (FN), values that meet the profile of the student (Oliveira-Martins et al., 2017).

Conclusions

The integration of digital platforms in the *design* of interdisciplinary pathways between school cycles and areas of knowledge is currently a challenge for teachers, particularly for teachers in initial training who have the opportunity to know and experience resources, methodologies and strategies that lead to new ways of teaching and learning in the XXI century. Through the didactic paths of vertical articulation and horizontal articulation using the *Educaplay* platform, it was possible to see some of the many potentialities of some of its functionalities.

In this sense, it was verified that this platform allowed the development of curricular knowledge, stimulating the main substantive concepts of each globalizing theme, but also the promotion of skills, values and attitudes conducive to the profile of the XXI century student.

Thus, digital technologies, such as digital platforms, must be problematized and integrated into educational practices as pedagogical tools that bring added value to the learning process and stimulate self-confidence, the achievement of skills, understanding of knowledge, reflection and argument in communication among other essential skills for the citizen of tomorrow.

Acknowledgments

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