# CHAPTER 6. THE USE OF DIGITAL PLATFORMS FOR SCIENCE LEARNING WITH 4TH GRADE STUDENTS: CHALLENGES, POTENTIALITIES AND DIFFICULTIES

**Beatriz Maria Vieira da Silva Salgueiro**

School of Education, Polytechnic of Porto, Portugal

**Vânia Gabriela Dias Graça**

School of Education, Polytechnic of Porto, Portugal

## I. Introduction

We are part of a world marked by the constant need for updating and evolution, which stems from the systematic transformations "caused by the emergence of globalisation and the advent of the information society" (Cardoso, 2014, p. 13). As pointed out by Quadros-Flores et al. (2011), the improvement of technologies and their incorporation into the daily life of each individual has transformed the way relationships and communications are established. Thus, it becomes essential that this evolutionary process is accompanied by everyone, namely by schools and educational institutions, through the development of "challenging practices, integrating new pedagogical strategies and other teaching resources, namely digital ones." (Graça et al., 2019, p. 126). In the line of thought of the same authors, its incorporation in the classroom context enables the teacher to develop creativity and the ability to adapt to any unforeseen events, contributing to the holistic development of the child and his/her learning. Therefore, digital technologies, used as cognitive learning tools, were intended to develop students' complex thinking (Jonassen, 2007).

The present study is part of the intervention project - "Knowing and learning for a healthy diet to have", developed with a 4th grade class as part of the Supervised Teaching Practice (STP) curriculum unit of the Master's Degree in Pre-school Education and Teaching in the 1st Cycle of Basic Education. Its general objectives were: i) to make students aware of the promotion of healthier eating habits through the transformation of healthier food practices;

ISBN: 978-84-1170-659-9

ii) to identify foods and/or food practices that contribute to the proper functioning of the human body's systems (respiratory, circulatory, and others) and its organs (skin, muscles, and others); and iii) to understand the evolution of food over time, particularly since the recollecting and agropastoral communities, studying the origin of certain foods that make up the food wheel. It emerged from a conversation between the cooperating teacher and the class, when one of the students mentioned that at home he adopted healthier eating practices, the result of a visit to a nutritionist. This sharing led to a great interest on the part of the group by the theme, leading to the construction of this project.

It is in this sense that the learning unit - "For healthy skin to present, care should be taken" - was created, which aimed to identify the foods and/or dietary practices that contribute to the proper functioning of the body organs, in this case, the skin. In this chapter, we will focus on one of the activities included in this unit, which aims to develop students' digital literacy through the use of different digital technologies throughout the lesson, exploring the pedagogical intentionality underlying each of them and exploring their potential for students' learning.

## II. Theoretical framework

Today's society brings with it numerous needs and demands that pose challenges to multiple sectors, particularly the educational systems, which must seek to devise strategies that can keep up with the changes that are emerging, as new ways of learning and teaching emerge. To this end, it is necessary that institutions and education professionals assume this change and seek to integrate new teaching methodologies into their educational practices, as is the case of active methodologies, which start from situations close to the child's daily life, which combined with varied resources, including digital, enable greater student involvement in the learning process (Moran, 2015).

Among the various existing active methodologies, *Design Thinking* should be highlighted, since its characteristics and different phases were approached during the actions developed in the STP context. In this sense, it is a methodology that aims to find solutions or identify improvements to problems, applying mechanisms such as creative thinking and collaboration (Stumm & Wagner, 2019). Also in the authors' view, during the course of the process, the educational professional assumes the role of mediator between the student and knowledge, providing access to multiple resources, in which the student is an active element in the construction of his learning. It begins

ISBN: 978-84-1170-659-9

with a question or challenge that directs the course of the different phases that follow. The first phase, *Discovery*, encompasses a first analysis and consequent understanding of the problem (Oliveira, 2014). Next, the *Interpretation* phase is the sharing of opinions and previous knowledge about the topic, issue or challenge under study. During this stage it is common for conflicts to arise, given the diversity of points of view, so the teacher has a key role in mediating them (Filho et al., 2015). The third phase, *Ideation*, encompasses the formulation of ideas to guide the investigative process, and it is common to develop mind maps as a way to structure and organise the thinking to follow (Stumm & Wagner, 2019). In phase four, *Experimentation*, the previously defined ideas and hypotheses are put into practice through different strategies and resources. Finally, the *Evolution* phase, in which all participants reflect, individually and together, on the entire process developed, analysing the results obtained and establishing a comparative bridge between the initial knowledge and the current informational baggage, thus enabling access to an active and self-evaluative teaching-learning methodology (Stumm & Wagner, 2019). It was, therefore, these phases that we sought to implement throughout the learning unit constructed.

Among the multiple resources that can assist in the integration of different active learning methodologies and, in this way, enrich the learning process, we highlight the technological resources that, as Quadros-Flores et al., (2012) state, "have played a particular role in shaping society over time" (p. 92). Their introduction in the social panorama and, particularly, in the school context represents the opening of a window of opportunities for educational institutions. In the author's line of thought (2012), its incorporation in the exploration of content in the classroom contributes to the student's development of multiple skills and acts, simultaneously, as a stimulus that generates encouragement, contributing to a progressive improvement in learning, when its use is effectively conceived as a cognitive tool that develops their complex thinking (Jonassen, 2007).

Of the various technological tools used, it is important to highlight *Educaplay*, *Wordwall, Mindmup, Animaker*, and *Youtube* as resources that integrated the learning unit presented in this chapter. The first, *Educaplay*, is an interactive platform that enables the digital development of activities (Salazar, 2014), allowing the "consolidation of knowledge" (Graça et al., 2021a, p. 98), but allows the development of different skills in the various moments of the lesson, thanks to its versatility in the types of activities it proposes. The *Wordwall* application also includes activities of different nature, which can be explored individually or in teams, contributing to the development of skills such as logical reasoning, autonomy, concentration

ISBN: 978-84-1170-659-9

and dexterity (Jesus & Mota, 2021; Sales et al., 2022). Regarding the *Mindmup* platform, it enables the creation of mind maps, in digital format, which can be revisited and changed whenever necessary, helping students to track their progress and schematize their own thinking. As for *Animaker*, this consists of a resource that provides for the creation of creative educational videos, consisting of a panoply of animations and elements that favour the creativity of each child, as well as enhancing their learning through this video construction (Marpaung & Hambandima, 2019). Finally, *Youtube,* a platform recognized worldwide for its variety of content, particularly educational content. *Youtube* is easily accessible and provides "dynamic and interactive" (Narciso et al., 2020, p. 1) content that enhances educational actions. Thus, the exploration of technological resources when framed in active methodologies, and with a defined pedagogical intentionality, can contribute to an increasing motivation of students for the construction of their learning, since they assume a participatory posture throughout the process, in a transdisciplinary approach.

In fact, curricular articulation proves to be fundamental in the learning process because, by articulating the different contents of the curriculum, students develop "readings and appropriations of reality in a contextualised and meaningful way" (Morgado & Silva, 2018, p. 47), and therefore, we sought to conduct transdisciplinary educational practices throughout the STP. At this level, the exploration of the various subjects does not occur in a segmented way; on the contrary, there is a "maximum degree of coordination between subjects" (Leite, 2012, p. 89) that allows students to understand and assimilate the different phenomena of the surrounding reality in an effective way (Graça et al., 2021b). Based on the assumption that themes of the reality surrounding students should be brought into the classroom, verifying their interests and curiosities, we proceeded to explore the theme of healthy eating, understanding its importance for the proper functioning of the human body organs, such as the skin.

Therefore, schools and educational institutions should explore this topic with children, encouraging them to learn about the food wheel and its different components, consume healthy and varied foods, and increase their daily intake of water (Direção Geral de Saúde, 2020). In fact, increased water intake is essential for the human body, since the lack of water affects the functioning of different parts of the body, hinders body temperature regulation, and impairs cognitive functioning (Padrão et al., 2014). In addition, it is during childhood that children begin to establish their food preferences and adopt behaviours that may affect, positively or negatively, their development. Finally, the restrictions imposed by the pandemic situation

ISBN: 978-84-1170-659-9

caused even more changes in children's daily lives, affecting their routines and eating habits, and leading to a high rate of obesity, so it is important to make students aware of these health issues that influence their learning process.

## III. Research methodology and data collection techniques of the study

Throughout the developed project, the Action-Research methodology was used, since it has potential for improving educational actions, as there is "a progressive variation between understanding, change, action and critical reflection of teaching practice" (Fonseca, 2012, p. 18). It is characterised by offering a critical and interventive stance towards what is observed with the purpose of transforming it (Coutinho et al., 2009).

In this sense, observation proved to be essential to collect data on the students' interests, needs, and difficulties, providing relevant information for the construction of more appropriate and relevant learning units, in a direct, participant and systematic way, allowing for the collection of authentic information about the focus group (Cardoso & Rego, 2017). Data were organised into daily records based on the dialogues and interactions that were established, observation grids, pre-observation scripts, daily and photographic records, as well as interviews with the cooperating teacher for a better characterization of the class and, in turn, to act more appropriately in the educational reality, particularly when planning was being developed. Reflection accompanied the whole educational process, being an important tool for improving educational practices and increasing the group's success (Alarcão, 2021).

### 3.1. Study Participants

In this study, 24 4th grade students (aged 8 to 10 years) from a school cluster in Porto participated. The class showed difficulties in the area of Portuguese in terms of spelling, and in the area of Mathematics, particularly in the interpretation and mobilisation of strategies to solve challenges. Regarding interests, the group appreciated the area of Expressions, in the subdomain of Visual Arts, the area of Portuguese in the construction of texts, and the area of Environmental Studies, showing curiosity for the theme of the human body. It should also be noted that the room had an interactive whiteboard and a computer with internet access, but there were no computers for the students and the internet was unstable, which influenced the development of the activities.

ISBN: 978-84-1170-659-9

## IV. Practical experience / Empirical experience

During the STP the project "Knowing and learning for a healthy diet to have" was built, with the previously mentioned objectives, which included seven pedagogical interventions, as shown in table 1.

**Table 1.**

*Identify the sessions of the intervention project and their objectives.*

| Intervention sessions | Main goals: |
|---|---|
| 1ª Session<br>"What care should be taken for the proper functioning of the respiratory system?" | • Recognize and explain some benefits of a healthy diet for the proper functioning of the respiratory system;<br>• Identify foods that contribute to the proper functioning of the respiratory system (citrus fruits, garlic, ginger). |
| 2ª Session<br>"If the heart is an involuntary muscle, why can bad habits cause it to stop?" | • Recognize and explain some benefits of a healthy diet for the proper functioning of the circulatory system;;<br>• Identify foods that contribute to the proper functioning of the circulatory system (berries, nuts, spinach). |
| 3ª Session<br>"Invented Fruits, Mixed Fruits" | • Recognize and explain some benefits of fruit consumption for the proper functioning of the body. |
| 4ª Session<br>"Healthy skeleton, recommended!" | • Recognize and explain some benefits of a healthy diet for the proper functioning of the human skeleton;<br>• Know some foods beneficial for the proper functioning of the human skeleton (chestnut). |
| 5ª Session<br>"For healthy skin to present, care we must adopt" | • Recognize and explain some benefits of a healthy diet and water intake for healthy, hydrated skin. |
| 6ª Session<br>"From the first peoples to the present day, a diet with variety" | • Understand and explain the diet of the first communities (recollectors c agropastoralists);<br>• Understand and explain the evolution of food over time, from the first peoples to the present day. |

ISBN: 978-84-1170-659-9

| | |
|---|---|
| 7ª Session<br><br>"Christmas traditions: understanding the present by looking at the past" | • Identify foods from the food wheel brought by the Romans and Muslims;<br><br>• Establish a comparison between the foods on the food wheel brought by the Romans and Muslims and the foods consumed today. |

**Source:** own elaboration.

In this context, digital technologies based on active and participatory learning methodologies were integrated into these intervention sessions, according to the intended pedagogical intentionality. However, in this article we will only focus on lesson 1 of the learning unit, in which a variety of digital platforms were used to develop students' digital, personal and social competencies (Table 2).

**Table 2.**

*Didactic course of lesson 1 of the learning unit.*

| Didactic Route | Goals | Essential Learnings | Resources |
|---|---|---|---|
| • Survey of students' previous ideas about the question "What care should we have with our skin?" and construction of a mind map, using the *Mindmup* platform; | • Identify and understand students' prior ideas about the topic;<br><br>• Handle the digital platform to express their ideas and thoughts about the topic. | • Select relevant information according to the listening objectives and record it using various techniques;<br><br>• Ask for and take the floor and respect others' speaking time;<br><br>• Participate with commitment in oriented speaking activities, respecting specific rules and roles;<br><br>• Use speech to express opinions and share ideas audibly, with good articulation, intonation and rhythm. | • Computer;<br><br>• *Mindmup* digital platform; |
| • Viewing a video about the different components of the skin, using the digital platform *Animaker*; | • Explore and understand the different constituents of the skin;<br><br>• Handle the digital platform for concept exploration; | • Select relevant information according to the listening objectives and record it using various techniques;<br><br>• Recognize simple body defense mechanisms and disease prevention;<br><br>• Use the computer and other digital devices as tools to support the investigation and research process; | • Computer;<br><br>• Interactive whiteboard;<br><br>• *Animaker* digital platform; |
| • Realization of a game about the contents covered, | | • Select relevant information according to the listening objectives; | |

ISBN: 978-84-1170-659-9

| | | | |
|---|---|---|---|
| using the digital platform *Wordwall;* | • Identify the different constituents of the skin;<br>• Handle the digital platform for the consolidation of concepts; | • Ask for and take the floor and respect others' speaking time;<br>• Participate with commitment in guided speaking activities, respecting specific rules and roles;<br>• Recognize simple mechanisms of defense of the body, and prevention of disease;<br>• Identify the potential and main functionalities of tools to support the process of online research and investigation. | • Computer;<br>• Interactive *Whiteboard*;<br>• *Wordwall* digital platform; |
| • Construction, in working groups, of a skin model, using plasticine; | • Represent the different constituents of skin;<br>• Collaborate with colleagues in the exploration of the material and in the construction of the final product. | • Use speech to express opinions and share ideas audibly, with good articulation, proper intonation and rhythm;<br>• Recognize simple defense mechanisms of the body, for example, the skin as the first barrier of protection and prevention of disease;<br>• Manifest expressive and creative abilities in their plastic productions, showing the acquired knowledge. | • Computer;<br>• Plasticine; |
| • Exploration of the different functions of the skin, using everyday materials; | • Explore materials presented;<br>• Understand, through manipulation of the materials, the different functions of the skin | • Use speech to express opinions and share ideas audibly, with good articulation, proper intonation and rhythm;<br>• Recognize simple defense mechanisms of the body, for example, the skin as the first barrier of protection and prevention of disease. | • Materials (water, ice, cotton, flour, orange peel, rock salt, crepe paper, pen clip); |
| • Viewing of a video about the functions of melanin, using the digital platform *Youtube*; | • Explore the concept of melanin and its function in the skin; | • Select relevant information according to the listening objectives and retrieve it through various techniques;<br>• Identify the potential and main functionalities of tools to support the research process and *online* research. | • Computer;<br>• Interactive Whiteboard;<br>• *Youtube* digital platform; |
| • Realization of a game about melanin, using the digital platform *Educaplay*; | • Explore the concept of melanin and its function;<br>• Handle the digital platform for concept exploration; | • Ask for and take the floor and respect others' speaking time;<br>• Participate with commitment in guided speaking activities, respecting specific rules and roles;<br>• Select relevant information according to the listening objectives; | • Computer;<br>• Interactive Whiteboard;<br>• Educaplay digital platform; |

ISBN: 978-84-1170-659-9

| | | | |
|---|---|---|---|
| | | • Use the computer and other digital devices as tools to support the investigation and research process; | |
| • Reading "Racism and Intolerance" by Louise Spilsbury | • Analyse work and identify key points;<br>• Understand the difference between racism and intolerance;<br>• Compare the message of the work with everyday life; | • Listen to read literary texts and express reading reactions in a creative way;<br>• Explain key ideas of the text;<br>• Select relevant information according to the listening objectives (...); | • Book "Racism and Intolerance" by Louise Spilsbury; |
| • Exploration of content related to word classes, based on the projection and analysis of an excerpt from the work; | • Identify the different word classes present in the highlighted words; | • Ask for and take the floor and respect others' speaking time;<br>• Participate with commitment in oriented speaking activities, respecting specific rules and roles;<br>• Use speech to express opinions and share ideas audibly, with good articulation, appropriate rhythm and intonation;<br>• Identify the class of words; | • Computer;<br>• Interactive whiteboard; |
| • Exploration of content related to word classes, using the digital platform *Wordwall*; | • Identify the different word classes;<br>• Handling the digital platform for concept exploration; | • Ask for and take the floor and respect others' speaking time;<br>• Participate with commitment in guided speaking activities respecting specific rules and roles;<br>• Use speech to express opinions and share ideas audibly, with good articulation, appropriate rhythm and intonation;<br>• Identify the class of words;<br>• Use the computer and other digital devices as tools to support the investigation and research process; | • Computer;<br>• Digital Platform *Wordwall;*<br>• Interactive Whiteboard; |
| • Construction of a bar graph with the different skin tones of the students in the class; | • Identify different skin tones of the class;<br>• Group the information according to the data obtained;<br>• Build a bar graph about the information; | • Participate with commitment in oriented oral expression activities, respecting specific rules and roles;<br>• Solve problems involving the organization and processing of data in various family contexts; | • Daily notebook; |

ISBN: 978-84-1170-659-9

| | | | |
|---|---|---|---|
| • Construction, in working groups, of a brief dramatic situation about a racist attitude and a possible solution; | • Identify racist situations and mobilize solutions;<br>• Work collaboratively;<br>• Plan the presentation of the situation and represent it; | • Plan, produce and evaluate short oral speeches, with varied vocabulary and complex sentences;<br>• Use processes of planning, textualization and revision;<br>• Produce short scenes from real or fictional data;<br>• Build characters, in different situations and purposes; | • Daily notebook; |
| • Making an alphabet soup about the contents discussed, using the digital platform *Educaplay;* | • Identify and consolidate the main concepts;<br>• Handle digital platform for the consolidation of content; | • Select relevant information and record it using various techniques;<br>• Recognize simple defense mechanisms of the body, for example, the skin as the first barrier of protection and prevention of disease; | • *Educaplay* digital platform; |
| **Descriptors of PASEO**<br>• Knowledgeable/knowledgeable/educated/informed (A, B, G, I, J); • Communicator (A, B, D, E, H); • Systematizer/ organizer (A, B, C, I, J); • Participative/collaborative (B, C, D, E, F); • Creative (A, C, D, J); • Reader (A, B, C, D, F, H, I); • Questioner (A, F, G, I, J); • Respectful of difference/ the other (A, B, E, F, H) | | | |

**Source:** own elaboration.

The pedagogical action began with the survey of students' previous ideas about the problem question: "What care should we take with our skin?", seeking students to assume their voices "as participation and as a right" (Costa & Sarmento, 2018, p. 74). We obtained answers such as: "We should drink water", "We should not get tattoos", "It is important to eat well", which were organised in an online mind map built by the students themselves using the *Mindmup* platform. Their construction allowed us to verify that some students already had relevant ideas about the importance of maintaining good eating habits and their influence on the good functioning of the different organs of our body, namely the skin. Then, a new question was posed: "Is the skin all the same thickness?", and the students were challenged to touch several parts of their bodies (eyelids, elbows, cheeks), establishing a learning moment, through touching their bodies, concluding there were places that presented a greater thickness than the others.

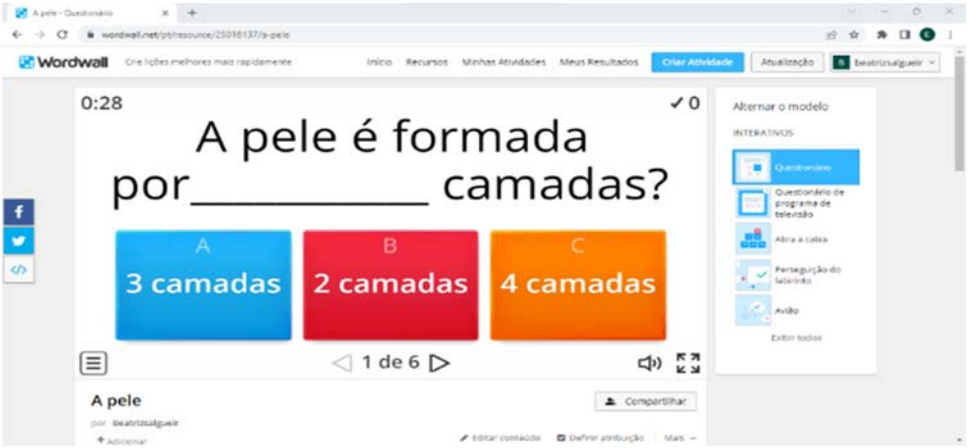
Subsequently, taking into account the fact that Information and Communication Technologies contribute to a more dynamic and participatory learning process (Garcia et al., 2012), a video was presented by the trainee teacher on the *Animaker* platform with information about the various

ISBN: 978-84-1170-659-9

components of the skin. As a way to explore the theoretical concepts discussed and given that one of the group's interests was related to the development of challenges and games, a game was presented on *Wordwall* (Figure 1), and it consisted of a set of blanks which should be completed with the correct answer about the topic studied.

**Figure 1.**

*Example of a question in the Wordwall platform.*




**Source:** Own authorship.

Taking into account that the dynamics of group work was an aspect to be improved in the class, we tried to develop activities with this purpose. Thus, we proceeded to the projection of a representative image of a piece of skin. Each group received a box with plasticine of different colours, and was challenged to represent the excerpt, culminating in a model with the three layers of the skin: epidermis, dermis and hypodermis. In order to explore the different functions of the skin, different materials were assigned to each of the groups - water, rock salt, ice, orange peels, flour and cotton - and, through a set of guidelines provided by the trainee teacher, the students were invited to explore the various elements.

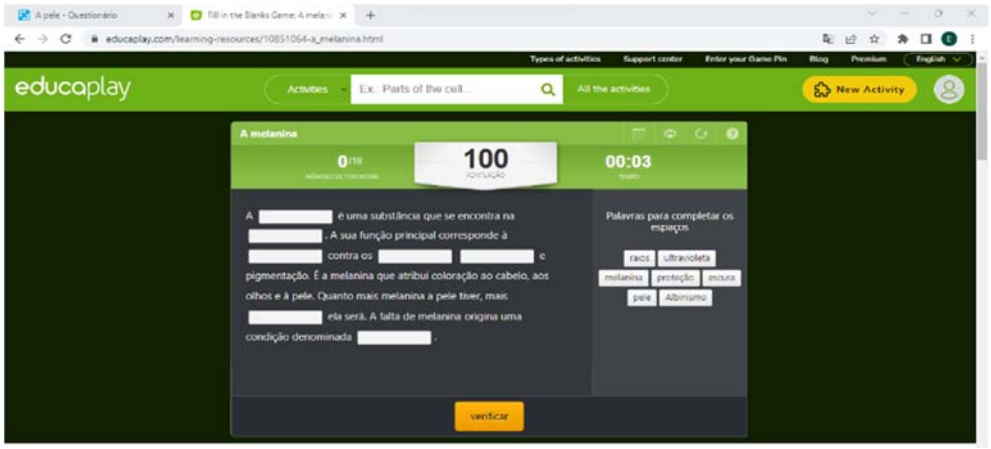
After addressing the constituents of the skin and its functions, a new challenge was proposed to the group: "Why is the skin of some people darker and others lighter? The question led to a moment of sharing of ideas that were clarified by watching a video on the *Youtube* platform, in which it was possible to address the definition of melanin and its respective function in an

ISBN: 978-84-1170-659-9

interactive way, developing information retention skills about what was viewed. As a way of consolidating the knowledge mentioned throughout the video, a new game was proposed (Figure 2), created from the *Educaplay* platform.

**Figure 2.**

*Game developed on the Educaplay platform.*




**Source:** own elaboration.

To start the next activity, the class was again asked: "The colour of people's skin is often a reason that leads to racist situations, isn't it? Have you ever witnessed any situation of this kind?" and, instantly, a dialogue began among all the students, ascertaining that no one had experienced racist and/or intolerant actions. Based on this interest, the book "Racism and Intolerance" by Louise Spilsbury (2018) was read, presenting the reader with situations of racism and intolerance and offering a wide range of strategies to help the reader understand and overcome them. After reading the work, again using the *Wordwall* platform, the group was invited to discover concepts that were hidden in an alphabet soup (Figure 3), and to explore and connect them to their true definition.

ISBN: 978-84-1170-659-9

**Figure 3.**

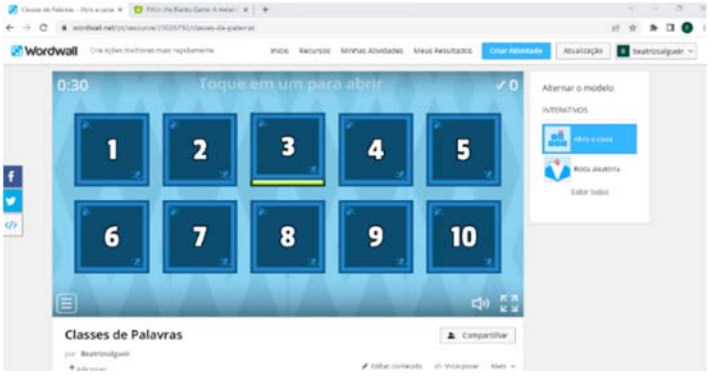
*Wordsword created on the Wordwall platform.*


**Source:** own elaboration.

In dialogue with the cooperating teacher, she expressed some concern about reviewing some grammatical contents related to word classes. Taking advantage of the story read, the trainee teacher chose, in a first phase, to project an excerpt of the text read and based on it, encourage students to discover different word classes. To complement this exploration, the teacher also challenged the students to choose a mystery box and to answer the underlying question, using the digital platform *Wordwall* (Figure 4).

**Figure 4.**

*Mystery game boxes created on the Wordwall platform.*




**Source:** own elaboration.

ISBN: 978-84-1170-659-9

Finally, the influence of melanin in the pigmentation of eyes, hair and skin tone was explored, first through the analysis of a table from the Environmental Study manual, and then through the creation of a bar graph representing the different skin tones of the group's elements: very light skin, light skin, dark skin and very dark skin, enabling the construction of a graph, working mathematical skills and linking with information from the student's everyday life (Decreto-lei n.º 241/2001, de 30 de agosto). In turn, students were challenged to create a dramatic situation involving a racist action and a solution to it, in an articulation between the areas of Visual Arts, Portuguese and Citizenship. Thus, several digital platforms were used at different moments of the class with different pedagogical intentions in order to develop students' learning and several competencies present in the guiding documents.

## IV. Results

The data analysis and discussion will focus on two aspects: i) the impact of the use of technological tools on students' learning; and ii) the potentials and difficulties in the use of digital platforms by the trainee teacher, using the observation notes (NO) and reflective narratives (NR) of the trainee teacher, and also some of the students' interventions (A).

### 4.1. Impact of the use of technological tools on student learning

Regarding the use of the different digital platforms (*Educaplay, Wordwall, Youtube, Animaker, Mindmup*) in the various moments of the class for the exploration of the skin theme, it was possible to verify that, *"during their handling, the students were motivated, interested, very participatory, establishing an enriching learning climate."* (NR). In this sense, it is important to understand the use of ICT through the voice of the students, verifying that its use enhances motivation, enthusiasm, willingness to learn: *"It's fun!"* (A2); *"I like these games."* (A5); *"I really like to answer."* (A7); *"Can we do it more often?"* (A10), contributing to an environment that is rich and conducive to learning.

As for the use of the digital platform *Wordwall*, it was found that *"This moment generated a motivating and interactive atmosphere, in which children worked collaboratively to achieve the correct answer, thus mobilising the knowledge they had built, thus working as a way to consolidate their learning about the theme."* (NR). However, the mentioned platform has other features, such as the alphabet soup, which allowed exploring, in an interactive way, the key ideas of the presented work, providing *"an easier interpretation of the*

ISBN: 978-84-1170-659-9

*concepts, besides developing aspects such as visual perception and students' attention span"* (NR); the multiple-choice modality allowed students to explore concepts about the different layers of skin and, simultaneously, *"develop the ability to understand and interpret statements, reasoning and consolidate definitions"* (NR); and, also, the mystery boxes *"aroused great interest in children who, motivated by the mystery associated with the choice, waited anxiously for their turn to select and answer"* (NR). Through this feature, it was possible to notice that students *"were attentive, motivated, worked in teams to discover the mystery question, positively impacting their ability to understand and assimilate the content"* (NR).

As regards the *Educaplay* platform, which had several tools and didactic resources, it allowed *"the group, through the challenge of completing the blanks, to work collaboratively to mobilise concepts and improve their ability to interpret the statements"* (NO). Thus, based on the use of these two platforms, we found that *"thanks to its versatility and variety, Wordwall and Educaplay allow us to explore multiple concepts and diversify the dynamics that are developed in group-class"* (NR).

As regards the use of the digital platform *Youtube*, as it is an application that is part of the students' daily life, *"it allowed them to realise the educational variant that this tool has. Thanks to its dynamism in the articulation between sound and video, it raised the students' attention to the themes that were addressed"* (NO). The technological tool *Animaker*, by providing several interactive features that allow the preparation of dynamic videos, was an asset to the class, since *"One of its features includes the possibility of regulating the time of the message transmitted, facilitating the concentration and assimilation of the student to the contents that are disclosed, besides allowing the student to interact with the video"* (NR). Regarding the use of the *Mindmup* digital platform, "a closer contact between the class and the technology was made possible, where each student had the opportunity to register his answer in the tool and, thus, build a collaborative mind map, offering a broad view of each one's shares and contributing for the group to feel comfortable in the manipulation of technological tools in the classroom" (NO), favouring the students' teaching and learning process.

Indeed, it can be seen that the use of ICT has contributed to the increase of the child's attention and commitment (Quadros-Flores et al., 2011), to the development of multiple skills, positively impacting the construction of meaningful and contextualised learning, and to the mobilisation of concepts worked in the classroom to everyday situations (Lento et al., 2018).

ISBN: 978-84-1170-659-9

4.2. Potentials and difficulties in the use of digital platforms by the trainee teacher

In view of the rapid changes that we are witnessing in our daily lives, it is essential that education professionals are pioneers in the way they adapt to the challenges that arise, and the trainee teacher always tries to build educational practices that would meet these changes. In this sense, during the practice developed, it was essential to incorporate innovative strategies in the pedagogical actions that were built to address the difficulties of each student and, simultaneously, guide students' learning success (Serrano de Carvalho, 2018).

In this way, it is important to refer to the challenge that was the integration of digital technologies in the educational process. Reflecting on the training process, becoming aware of oneself and one's limits in the context of pedagogical and technological knowledge is essential for the professional development of teachers. According to the trainee teacher's experience, although she considered the mobilisation of technological resources to the school environment pertinent, initially its integration brought difficulties: *"Although the classroom had resources such as computer and interactive whiteboard, the internet network often failed, making it difficult to integrate technologies in the dynamics. In addition to this factor, during the first planning sessions when I was challenged to integrate ICT in the context, I realised that I had very traditionalist ideas. The proposal to integrate ICT revolutionised the way I looked at education".* (NR).

These first difficulties were evidenced in the reflective narrative of the trainee teacher, but they were not inhibiting reasons for the construction of innovative practices, as she was willing to diversify her practices, in an openness to change and updating, in order to provide students with *"favourable conditions for the development of their skills*" (Gouveia, 2016, p. 24). However, it is important to highlight that, although the classroom had technological resources such as computers and interactive whiteboards, and the cooperating teacher used them with some frequency, the fear of not engaging students in learning was present: *"Students come into contact with technology every day. This particular group was active, participatory and extremely interested in exploring technological tools. I found that the students with more difficulties felt more comfortable when the topics were covered in digital resources. Thus, I needed to bring innovative challenges to capture the group's attention and motivate them to learn. I felt that I had to challenge myself to develop different dynamics and work with the concepts in a different way."* (NR).

ISBN: 978-84-1170-659-9

To assist in this process of selecting digital platforms and developing a knowledge articulation between them and the contents to be addressed, it is essential to highlight the collaborative work developed with the institutional supervisor, the cooperating teacher and the pedagogical pair who, through dialogues, provided moments of reflection, questioned knowledge and paid attention to the difficulties experienced, often articulating theoretical and practical concepts (Ribeiro et al., 2016): *"The collaborative work was essential for the construction of enriching practices. Through the dialogues developed with the cooperating teacher, the pedagogical pair and the institutional supervisor, we were able to share our fears, discuss strategies and solutions to the challenges that emerged, and get to know multiple digital platforms (many of them used in the elaborated dynamics), which contributed to the development of my digital literacy and that of the group".* (NR).

It should be noted that, during the implementation of the dynamics, one of the main difficulties was time management, opting for offering time to the student to explore the digital platform: *"When we give the student a digital platform and allow him to explore it autonomously, it is important to respect his pace. As children have different rhythms, sometimes the time that was planned for a particular activity ended up being extended, conditioning the course of the following activities. Also, here the role of collaborative work proved to be pivotal."* (NR).

The dynamics of the actions presented above, and the incorporation of digital platforms, had a very positive impact, both on student learning and on the development of students' and trainee teacher's digital literacy, as evidenced in her reflective narrative: *"It was possible to explore different themes with the children and allow them to access a variety of information from the real context, thus broadening their information baggage and enabling them to realise the importance of ICT as a mechanism to learn about the world we live in. The practice developed allowed us to see the need to respect each child and provide them with enriching educational paths, which provide the necessary foundations to face the adversities of the future with security and confidence".* (NR).

Thus, the trainee teacher overcame the difficulties, sought to build knowledge about the use of different digital platforms in student learning, finding solutions that allowed to carry out the educational practice, envisaging new ways of learning and teaching, with a view to the professional development of teachers, since professional growth, as Graça et al. (2019) state, is materialised by the experiences carried out in real contexts, in a joint

ISBN: 978-84-1170-659-9

and interactive dialogue with the agents involved, for a renewal of educational practices.

## V. Conclusions

The rapid evolution of society brings with it numerous challenges that directly or indirectly affect society, including education. One of these challenges includes the incorporation of technologies in the classroom, given their potential to promote learning and skills in students. The teacher cannot escape this reality and must seek to create opportunities for its integration in the classroom.

With regard to the activity conducted and the platforms used in it, we can conclude that the use of technological resources by students enhanced their learning, contributing to the development of reasoning, critical and creative thinking, autonomy, teamwork and others, and increased concentration and motivation. In addition, it enabled the development of digital literacy, not only in the students but also in the trainee teacher, who embraced the challenges and tried to build practices directed to the challenges required in this century, from a constructivist perspective.

On the contrary, it is fundamental that professionals try to develop dynamics that can keep up with the evolution of society and allow students to grow and develop in a holistic way, capable of facing the challenges of the future.

## References

Alarcão, I (2021, novembro 30). Ser professor reflexivo. http://sipeadturmad5.pbworks.com/w/page/117123798/atividadeseixov

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – Português*.

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – Matemática*.

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – Estudo do Meio.*

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – Educação Artística (Artes Visuais).*

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – Educação Artística (Expressão Dramática/ Teatro).*

ISBN: 978-84-1170-659-9

Direção-Geral de Educação (2018). *Aprendizagens Essenciais: 4.º ano, 1.º ciclo do ensino básico – TIC*.

Cardoso, A. (2014). As atuais exigências inovadoras e o interesse crescente pela investigação-ação, em educação. In Imprensa da Universidade de Coimbra (Ed.), *Inovar com a investigação-ação: desafios para a formação de professores* (pp. 13 - 14). Imprensa da Universidade de Coimbra.

Cardoso, A. & Rego, B. (2017). Metodologias de investigação na formação de professores: a investigação-ação e o estudo de caso. In L. Menezes, A. P. Cardoso, B. Rego, J. P. Balula, M. Figueiredo, & S. Felizardo (Eds.). *Olhares sobre a Educação: em torno da formação de professores* (pp. 21-33). Escola Superior de Educação de Viseu.

Coutinho, C., Sousa, A., Dias, A., Bessa, F., Ferreira, M., & Vieira, S. (2009). *Investigação-Acção: metodologia preferencial nas práticas educativas. Psicologia, Educação e Cultura, XIII*(2), 355-380.

Costa, C., & Sarmento, T. (2018). Escutar as crianças e (Re) configurar identidades - interações com voz. *Educação em Análise*, *3*(2), 72-94. https://doi.org/10.5433/1984-7939.2018v3n2p72

Decreto-lei n.º 241/2001, de 30 de agosto. Diário da República n.º 201/2001 - I Série. Ministério da Educação. Lisboa. *Aprovação dos perfis específicos de desempenho profissional do educador de infância e do professor do 1.º Ciclo do ensino básico.*

Direção-Geral da Saúde. (2020). *Vamos pôr a Alimentação Saudável em casa. Direção Geral da Saúde.*

Fonseca, K. (2012). Investigação – Ação: uma metodologia para prática e reflexão docente. *Revista Onis Ciência, 1*(2), 16-31.

Garcia, M., Rabelo, D., Silva, D., & Amaral, S. (2012). Novas competências docentes frente às tecnologias digitais interativas. *Teoria e Prática da Educação, 14*(1), 79-87. https://doi.org/10.4025/tpe.v14i1.16108

Gouveia, F. (2016). Da didática à matética: o papel do professor como mediador qualificado. In: F. Gouveia & G. Pereira (Orgs.), *Didática e Matética* (pp. 23 - 46). CIE-UMa - Centro de Investigação em Educação. http://hdl.handle.net/10400.13/2098

ISBN: 978-84-1170-659-9

Graça, V., Quadros-Flores, P., & Ramos, A. (2019). Renovação metodológica no ensino primário: o olhar de um estudante estagiário. *Revista Sensos-e*, *VI*(2), 124-133. https://doi.org/10.34630/sensos-e.v6i2.3495

Graça, V., Quadros-Flores, P., & Ramos, A. (2021a). O potencial das ferramentas cognitivas Educaplay e LearninApps na consolidação de saberes. In C. Fernández, B. García, M. Miranda & H. Delgado (Ed.), *La evaluación de las enseñanzas en los contextos digitales: nuevas perspectivas y enfoques evaluativos* (pp. 98-110), Editorial DYKINSON.

Graça, V., Quadros-Flores, P., & Ramos, A. (2021b). The Integration of the Digital Platform Educaplay in Interdisciplinary Paths in the 1st and 2nd Basic Education Cycles. *Athens Journal of Education,* (8), 1-16. https://doi.org/10.30958/aje.X-Y-Z

Filho, V., Cruz, N., & Pereira, F. (2015). Design Thinking, cognição e educação no século XXI. *Revista Diálogo Educacional*, *15*(45), 579-596. http://dx.doi.org/10.7213/dialogo.educ.15.045.AO01

Jesus, R. & Mota, V. (2021). Ensino remoto: apresentação de jogos da plataforma Wordwall para ensinar estatística nos anos iniciais. *Revista científica Multidisciplinar Núcleo do Conhecimento, 4*, 102-122. http://dx.doi.org/10.32749/nucleodoconhecimento.com.br/educacao/apresentacao-de-jogos

Jonassen, D. (2007). *Computadores, Ferramentas Cognitivas: Desenvolver o pensamento crítico nas escolas*. Porto Editora.

Leite, C. (2012). A articulação curricular como sentido orientador dos projetos curriculares. *Educação Unisinos*, *16*(1), 88-93.

Lento, A., Guimarães, A., Oliveira, C., Azevedo, D., Pinheiro, D., Maceda, D., Cabral, I., Machado, I., Ribeiro, J., Cardoso, J., Alves, J., Freitas, M., Ferreira, M., Lourenço, M., Norton, N., Jesus, P., Cruz, R., Amaral, S. Costa, S., Lima, T. (2018). *Inovação pedagógica e mudança educativa - Da teoria à(s) prática(s).* Faculdade de Educação e Psicologia da Universidade Católica Portuguesa.

Marpaung, T. & Hambandima, E. (2019). Exploring animaker as a medium of writing a descriptive text: EFL students' challenges and promoted aspects of digital storytelling literacy. *Academic Journal of Educational Sciences*, *3*(2), 27-32.

ISBN: 978-84-1170-659-9

Moran, J. (2015). Mudando a educação com metodologias ativas. In C. A. Souza & O. E. T. Morales (Orgs.), *Convergências Midiáticas, Educação e Cidadania: aproximações jovens* (Vol. 2, pp. 5-33), Proex. http://hdl.handle.net/10198/3962

Morgado, J. C., & Silva, C. (2018). Contextualização, articulação, flexibilidade e autonomia curricular: pilares para a inovação e mudança educativa. In I. C. Viana, A. Costa, A. M. Serrano, A. M. Silva, B. Sampaio, C. Silva, I. Candeias, J. Sousa, J. C. Morgado, L. Palhares, M. J. Gomes, M. J. Magalhães, N. Correia, R. Pinheiro, T. Vilaça & V. Timmerman (Eds.). *Ensino transversal: flexibilidade curricular e Inovação. Crosscurricular teaching: curriculum flexibility and innovation* (pp. 39-51). Centro de Investigação em Estudos da Criança – Research Centre on Child Studies (CIEC) / Universidade do Minho – University of Minho.

Narciso, A., Sá, A., & Narciso, L. (2020). *Ensino em conexão: o Youtube como ferramenta pedagógica de aprendizagem matemática* [Conference session]. XIV Congresso Internacional de Linguagem e Tecnologia – Online.

Oliveira-Martins, G., Gomes, C. A. S., Brocardo, J. M. L., Pedroso, J. V., Carrillo, J. L. A, Silva, L. M. U., Encarnação, M. M. G. A., Horta, M. J. V. C., Calçada, M. T. C. S., Nery, R. F. V., & Rodrigues, S. M. C. V. (2017). *Perfil dos Alunos à Saída da Escolaridade Obrigatória.* Ministério da Educação/Direção-Geral da Educação.

Quadros-Flores, P., Escola, J., & Peres, A. (2011). O retrato da integração das TIC no 1.º Ciclo: Que perspectivas? In P. Dias e A. Osório (Coord.). VII Conferência Internacional de TIC na educação – Challenges (pp. 401-410). Universidade do Minho. http://hdl.handle.net/10400.22/6401

Quadros-Flores, P., Escola, J., & Peres, A. (2012). Formar para Inovar, Inovar Formando. In J. Rodriguez, C. Fernandez & D. Gonçalves. (Org). III Encontro Internacional Fenda Digital: TIC, Escola e Desenvolvimentos. Projetos mediados pelas TIC (pp. 91-98). Escola Superior de Educação Paula Frassinetti e Nova Escola Galega. http://hdl.handle.net/10400.22/6334

Oliveira, A. (2014). A contribuição do Design Thinking na educação. *E-Tech: Tecnologias para Competitividade Industrial*, 105-121.

Padrão, P., Lopes, A., Lima, R., & Graça, P. (2014). Hidratação adequada em meio escolar. Direção-Geral da Saúde/ Direção-Geral da Educação.

ISBN: 978-84-1170-659-9

Ribeiro, D., Quadros-Flores, P., & Sá, S. (2016). Os processos comunicacionais na formação profissional: perceção dos estagiários. Livro de Atas - 1. *Encontro Internacional de Formação na Docência.* http://hdl.handle.net/10400.22/12235.

Salazar, N. (2014). *Influencia del Uso de la Plataforma Educaplay en el desarrollo de las) capacidades de comprensión y producción de textos en el área de inglés en alumnos de 1er año de secundaria de una institución educativa particular de Lima*. Tesis de Maestría en Integración, Educación e Innovación Educativa de las Tecnologías de la Información y la Comunicación (TIC). Pontificia Universidad Católica del Perú Escuela de Posgrado.

Sales, D., Guilherme, R., Junior, E., & Sete, D. (2022). O uso da plataforma Wordwall como estratégias no ensino de química. *Brazilian Journal of Development*, *8*(3), 16959-16967. https://doi.org/10.34117/bjdv8n3-097

Serrano de Carvalho, L. (2018). A diferenciação pedagógica e curricular na voz de docentes. *Revista Portuguesa de Investigação Educacional* (18), 57-88. https://doi.org/10.34632/investigacaoeducacional.2018.3454

Spilsbury, L. (2018). *Racismo e intolerância*. Bertrand Editora.

Stumm, L. & Wagner, A. (2019). O uso da abordagem do design thinking na educação. *Boletim técnico-científico IF Farroupilha*, *5*(1), 9-17.

ISBN: 978-84-1170-659-9