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SUMARIO • SUMMARY • RESUMO

Editorial

A new issue of the journal MLS Pedagogy, Culture and Innovation (MLSPCI) is published as proof of the continuity of a project that is enriched day by day with the reception of more and more manuscripts. It is packed with research and proposals that invite us to rethink and transform education, culture and learning environments. Current themes are explored that connect pedagogy with creativity and innovation, giving voice to authors committed to educational and cultural transformation.

The six articles that make up this issue deal with diverse topics. Thus, in a research project, a Teaching Unit (UD) was designed and applied for the training of Biology teachers, focused on human nutrition. Food Profiles (PeA) and Food Landscapes (PA) were introduced, multimodal devices that integrate photographs and comments from students, shared on social networks. These tools allowed us to analyze food practices from biological and sociocultural approaches, obtaining a significant inventory of practices that was key to the analysis and reflection on the UD activities. A research on gamification as an educational strategy for teaching English in primary education is presented. A qualitative approach is developed, based on literature and case analysis, to design innovative teaching materials. The results show that gamification motivates students, improves their language learning, encourages participation and the development of communicative, intercultural and creative skills, highlighting it as an effective pedagogical tool.

The objective of the other article is to analyze the alignment of English textbooks in primary school in Chile with international regulations on diversity and interculturality. Through a content analysis, it was identified that only some texts adequately address cultural diversity, although most lack an effective focus on intercultural dialogue. It is recommended to improve the content and apply teaching strategies that promote inclusion and intercultural competences in educational materials.

The integration of ICTs in education transforms learning by making it interactive and personalized, overcoming traditional barriers to access to information. However, there are challenges such as lack of infrastructure, teacher training, and resistance to change. It is essential to balance technology with clear pedagogical objectives and ensure equal access, while addressing issues of student security and privacy.

Artificial intelligence (AI) in education allows for personalized learning and improved administrative processes, adapting content to student needs. However, ethical challenges arise, such as data privacy and algorithmic bias, which can affect educational equity. It is necessary to establish ethical and transparent policies that maximize the potential of AI to optimize learning outcomes. Finally, the last article analyzes the influence of teaching practices on student motivation in Biology classes at Xangongo High School. Through observation, surveys and interviews, it was found that the predominant expository methods and the lack of sophisticated teaching resources limit student motivation and participation. 80% of students expressed their lack of interest in the subject, highlighting the need for more effective and motivating teaching strategies.

In conclusion, the studies presented highlight the need to apply innovative methodologies that encourage motivation, inclusion and personalized learning, although challenges such as lack of resources and teacher training persist. Overcoming these obstacles is key to ensuring a more effective, equitable education that is adapted to current demands.

Antonio Pantoja Vallejo
Editor Jefe / Editor in chief / Editor Chefe

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The elaboration of food profiles and landscapes as multimodal devices for food education from complex approaches in teacher training

La elaboración de perfiles y paisajes alimentarios como dispositivos multimodales para la educación alimentaria desde enfoques complejos en la formación del profesorado

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ABSTRACT

In a research project, we designed, implemented and evaluated a Didactic Unit (UD) for the training of Teachers in Biology, focused on human nutrition. The aim of this article is to characterize the innovative methodology used to develop Food Profiles (PeA) and Food Landscapes (PA), multimodal devices organized from photographs of eating episodes, which include comments that refer to the conditions in which they are carried out, produced by the students themselves, shared in a social network and organized in a database of the university campus. These devices were used in the classes and allowed them to analyze their eating practices from complex approaches, in a way consistent with the vision of human food adopted, from which the biological/nutritional and sociocultural components are inextricably linked. The results show that the organization and implementation of the methodological device led to the production of a significant inventory of students' eating practices and contexts, which were used as a platform for problematization and analysis in different activities of the UD.

Palabras clave:
perfiles alimentarios, paisajes alimentarios, metodología, educación alimentaria, enfoques complejos.

RESUMEN

En un proyecto de investigación, diseñamos, implementamos y evaluamos una Unidad Didáctica (UD) para la formación del Profesorado en Biología, centrada en la alimentación humana. El objetivo de este artículo es caracterizar la metodología innovadora utilizada para elaborar Perfiles Alimentarios (PeA) y Paisajes Alimentarios (PA), dispositivos multimodales organizados a partir de fotografías de episodios de alimentación, que incluyen comentarios que hacen

	referencia a las condiciones en que éstos se llevan a cabo, producidos por los propios estudiantes, compartidos en una red social y organizados en una base de datos del campus universitario. Estos dispositivos fueron utilizados en las clases y les permitieron analizar sus prácticas alimentarias desde enfoques complejos, de manera consistente con la visión sobre la alimentación humana adoptada, desde la cual los componentes biológico/nutricional y sociocultural se encuentran indisolublemente unidos. Los resultados muestran que la organización e implementación del dispositivo metodológico dio lugar a la producción de un significativo inventario de prácticas y contextos alimentarios de los estudiantes y que fueron utilizados como plataforma de problematización y análisis en diferentes actividades de la UD.

Introduction

Teacher training is undergoing a transformation towards a more comprehensive approach, aimed at developing strategies that enable a comprehensive and multidimensional understanding of complex problems such as human nutrition, and enable its teaching from a multi-referenced approach consistent with this conceptualization of the phenomenon. In this line, a study has been carried out focused on the design, implementation and evaluation of a Didactic Unit (UD) for biology teacher training, which is framed in this teaching perspective and uses Food Profiles (PeA) and Food Landscapes (PA), developed from records of the students' own food practices and contexts, as platforms for problematization and analysis.

Food is a central activity in the daily life of any social group, and its study requires a multidimensional approach that considers biological-health and sociocultural aspects and their close relationships (Contreras and Arnaiz, 2005). In this sense, the use of PeA and PA, allows for the staging of the complexity of the students' ways of eating inside and outside the institution, facilitating a comprehensive understanding of their eating practices and contexts and promotes, in parallel, a metacognitive exercise, since the students themselves plan and carry out the collection of primary data, thus pointing to an epistemic break with the traditional way of conceiving educational research.

The PeA and PA were constructed by the team in charge of the study, based on photographs and posts produced by 60 students from two biology courses at a public university in Argentina, using the social network Instagram with a private configuration and a database of the university virtual campus. The PeA gather all the food episodes of a student for each day of recording and account for individual and identity food choices. The APs bring together all the food episodes of all the students, but referring to a single meal or intake, for example: "Weekend Lunch", and provide a broader and more meaningful view of a group's or community's meals. This approach allows for an in-depth analysis of how food, environments and social interactions are intertwined. The PeA and the PA elaborated were the basis of analysis that initiated and continued the development of the didactic unit, in which the student teachers were able to open up different dimensions: nutritional, sociocultural, neurobiological and meta-scientific, giving rise to a complex and multi-referenced approach to their own food practices (Bahamonde and Lozano, 2023).

Method

Target

The aim of this article is to describe and justify the methodology used for the production of Food Profiles (PeA) and Food Landscapes (PA) using the social network Instagram with a private configuration, as devices that account for the food practices and contexts of students and allow addressing their complexity. We also intend to describe the adjustments made in the process of elaboration and implementation in the classroom and to outline a model protocol for implementation in different educational contexts.

Theoretical and methodological background

Working with photographic images and audiovisual records is a powerful tool in the framework of social research. Working with images implies a challenge and a series of decisions that go beyond the mere illustration of ideas, imagining combinations with

other discourses that allow us to enhance more adjusted ways of capturing reality and strengthen its analytical possibilities. Based on this premise, research in the field of food related to PeA and PA has been nourished by various theoretical-methodological currents that use images or image-text complexes as a central tool for analysis.

One approach that frames the methodological perspective we adopt in our research comes from the ideas elaborated by Kress (2010) about multimodal discourse. This author incorporates the notion of "multimodal complex" that adds to the "mode" image the "mode" writing or other semiotic modes, which give context and action to the photograph. The concept "modal affordance", adapted by Kress (2010), refers to the potentialities and constraints presented by different "modes" to represent or communicate meanings or senses more easily, depending on their particular semiotic resources. In a communication in which only the writing mode is used, impressions, meanings and visual aspects will have to be described only through the semiotic resources of writing, giving rise to a multiplicity of interpretations, mental images and senses, and although the multimodal complex is also susceptible to interpretations, these will be more consistent as they come from the interactions and reinforcements between various semiotic modes such as image, written text, oral narration, audio recording or others.

From this perspective of analysis, and in the field of food education, we identify different lines that are powerful to guide the question of "registration" in our research work: Foodscapes, Food Profiles or Foodstyling, each with its own characteristics and significant contributions to the field.

The notion of "foodscape" has become increasingly relevant in health promotion and public nutrition, as well as in food studies on different populations that use them as tools to describe environments and assess their influence on food choices and behaviors. Mikkelsen (2011), in reviewing the growing number of foodscape studies and tracing the origin of this idea, characterizes and reflects on the various contributions and discusses their applicability in human food research, especially in relation to out-of-home feeding environments such as schools and institutions. In this current, the use of photographs is valued as a means to document and understand the food practices and contexts of students inside and outside the educational environment. This methodology allows researchers to visually and tangibly capture their ways of eating, as well as their preferences, consumption environments and food-related social dynamics. In the article "Nordic Children's Foodscapes: Images and Reflections" (Johansson, B. & Mäkelä, J. & Roos, G. & Hillén, S. & Hansen, G. & Jensen, T. & Huotilainen, A., 2009), self-generated images are used to explore and analyze their individual foodscapes. This study also includes in-depth interviews and focuses on the relationship between children and food, specifically on how they describe and reflect on aspects of their daily lives related to food.

With respect to the perspective linked to Food Profiles, and within the framework of the "Food Profile Project" (2015), primary and secondary school students record all the food episodes they consume per day, in a period of time to be determined. They make their records by creating photographs of each item they consume (while doing so) and record audio that explains the context in which they consume those foods and beverages. The combination of images and audios provides valuable information that constitutes the complete food profile of each student and the circumstances involved in their consumption (Guidalli and Torralba, 2015, Torralba and Guidalli, 2013). The authors argue that these contexts are rarely taken into account in most surveys or research and postulate that this knowledge is fundamental for the development of successful initiatives in the pedagogical, political and/or practical spheres.

Finally, perspective: Foodstyling focuses on the aesthetic presentation of food through culinary styling techniques (Introduction to Food Styling, 2024). Foodstyling is used to create attractive and suggestive visual compositions. This technique seeks not only to document the food consumed, but also to convey information about its preparation, presentation and cultural or social significance. It addresses the aesthetic issue in the production of food images that circulate on social networks to provoke various sensitivities and assessments by viewers.

Together, these currents offer an integral and multidimensional approach that has nourished our research on the educational approach to human nutrition. In particular, the first mentioned perspectives have provided elements of theory and fieldwork that we have adapted or recreated in specific methodological instruments to study the students' PeA and PA from their complexity and to carry out a detailed exploration of their food practices and contexts. As for the Foodstyling perspective, it has oriented the analysis of the data obtained in relation to the aesthetic category within the framework of the discourses associated with the sociocultural dimension (Gracia Arnaiz, 1996).

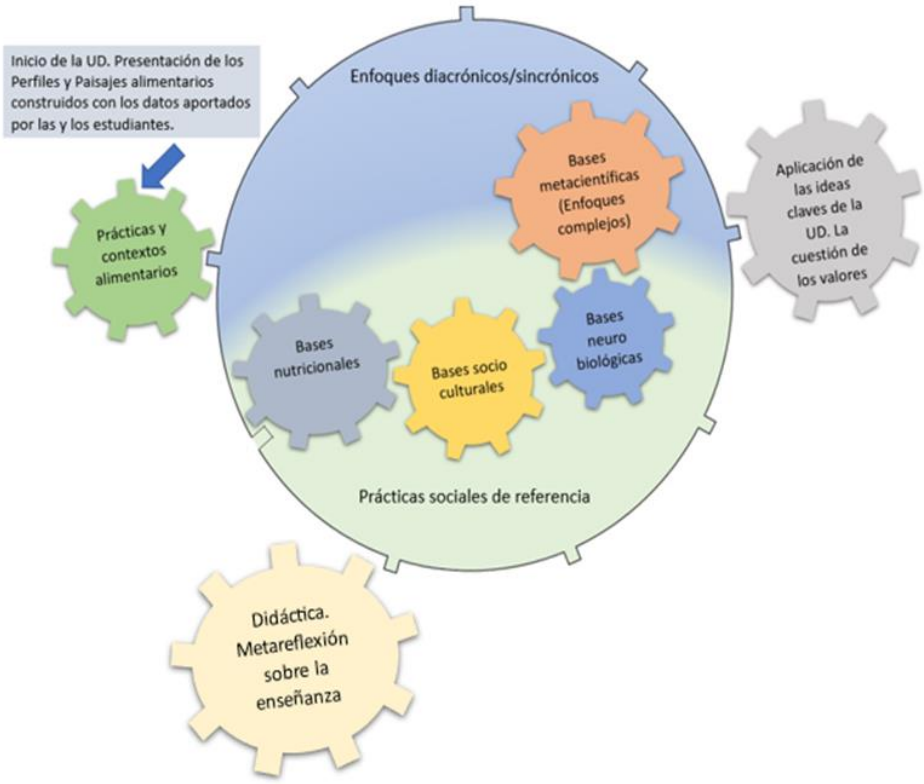
The research we have developed also constitutes valuable background for the present article because it has facilitated the construction of theoretical and methodological knowledge about the ways of eating of high school students in schools located in the province of Río Negro in Patagonia (Bahamonde, N., Lozano, E., Pintos, J. C. and Dillon, L., 2021; Caminos, C., Ferrari, M., Bahamonde, N. and Lozano, E., 2021) and compare them with research carried out in other cultural contexts, for example, with high school students in Mexico (Matus Matíaz, A. 2024) and with university professors in Brazil (Bahamonde, N., 2024).

The Design of the UD

The design of the Didactic Unit (DU) included a series of activities that guided students in the analysis of food profiles (PeA) and foodscapes (PA). These activities focused on developing modeling processes of key ideas in various disciplinary fields, such as nutrition, anthropology, neurobiology and the nature of science. Interactions between these fields were promoted, facilitating the establishment of relationships between them from diachronic and synchronic perspectives. This implied considering the phenomenon "in history, in the present and in future projections", as well as in different contexts, societies and cultures. In addition, reference social practices and diverse performance profiles were identified (see Figure 1)

Figure 1

General plan of the development of the DU. Disciplinary fields involved and sequence of tractions between them.



Methodological Device

The general methodology of the research is guided by a qualitative approach, and the data are obtained from the implementation of a DU in the natural context of the classes, in charge of the teachers of the different disciplinary spaces (Taylor, 2014) Now, within the framework of the background presented, the key aspects of the methodological device that we designed for the elaboration of PeA and PA are the following:

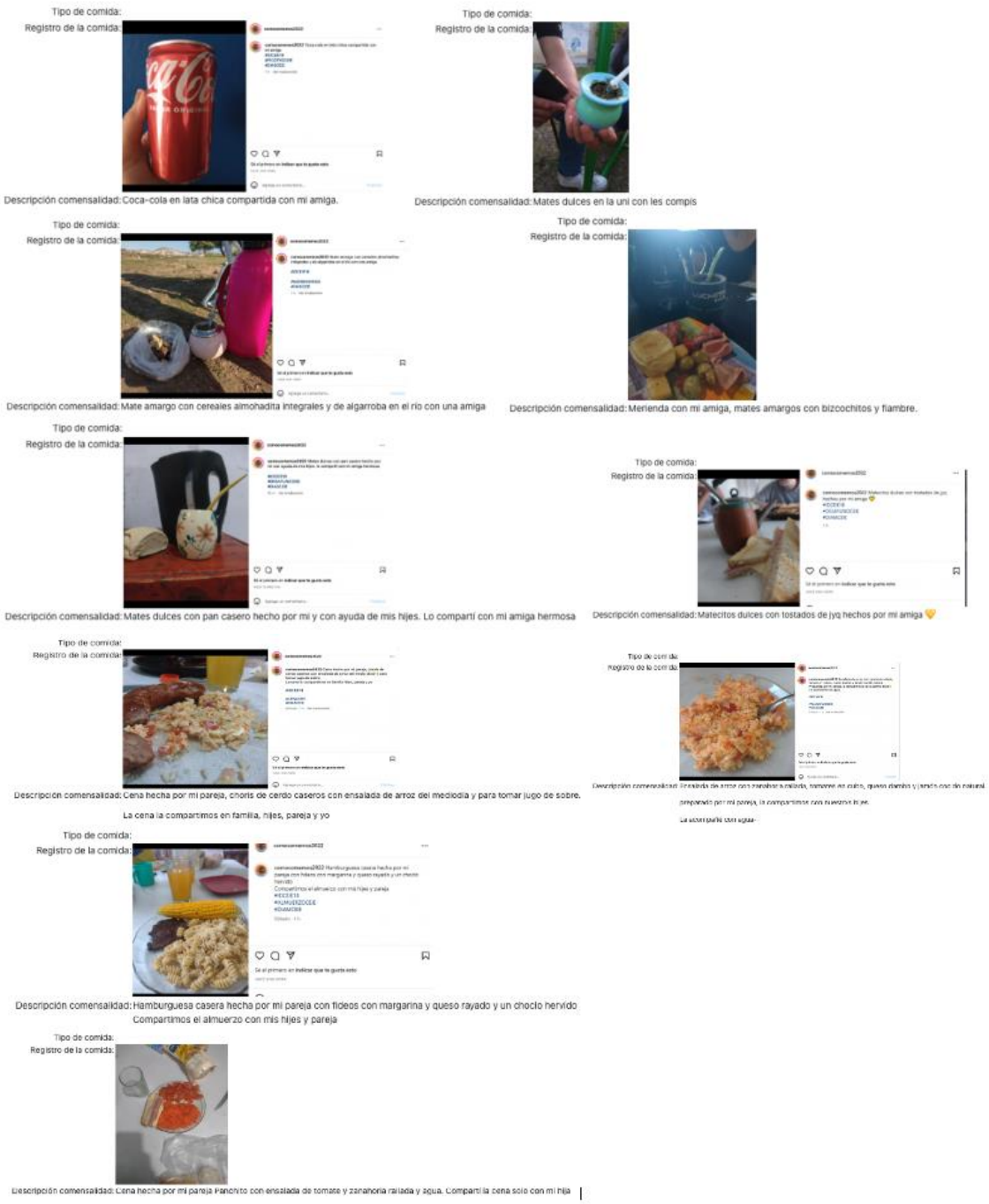
1- The consideration of a basic unit of registration: the "annotated image". It is an individual production of each student that involves the photographic record of the content of a food episode and an attached commentary in which he/she describes: the content of the food, if he/she is alone or accompanied, if it is self/family made or if it is purchased and in which place he/she is eating. It also contains a # that identifies the episode: #breakfast; #pickle; #lunch; #mid-afternoon; #dinner

Figure 2
Sample post for a dinner party, weekday.

2- The use of the social network Instagram, in a private configuration, for students to share the commented images and the sending to a database in the university's virtual campus.

3- Work on the database for the elaboration of the Food Profiles (PeA). It involves gathering in a single record and for each student, all their annotated images. In this way, the database has all the students' PeA.

Figure 3
Food Profile Example (IDCEIE18)



4- Work on the database for the elaboration of the Food Landscapes (PA). It involves gathering in a single record all the annotated images corresponding to a #. For example: "PA #weekenddaydinner." In this way, the database has all the APs for each type of food.

Figure 4
Example of Food Landscape: weekend daytime dinner.

5- Organization of all registration units in the virtual site of the campus: annotated images, PeA and PA, in the form of: "inventory of food practices and contexts" of students, for access and use.

In this way, the methodology developed, attends to the idea of "multimodal complex" (Kress) and gives students a central role in the research (Johansson et al., 2009), getting involved in the elaboration of the devices that will later be used in the classes to think in a complex way about human nutrition, a task that goes beyond the conventional formats of the surveys they usually answer to provide information about their diet, generally of a nutritional nature.

In summary, "annotated images" are organized from the perspectives of "food profile", which is singular and identitary for each individual (Guidalli and Torralba, 2015), and "food landscape" (Johansson et al., 2009; Mikkelsen, 2011; Torralba and Guidalli, 2013), which allows a more meaningful description and interpretation of what and how the students as a whole eat, allowing to infer traits specific to the community.

Analysis of the process of elaboration and implementation of the methodological device

Previous preliminary studies (Bahamonde et al 2021), in which work began with a methodology close to the one mentioned above, made it possible to identify different aspects that appeared as problematic for the development of activities that would result in a quality production, expressed in PeA and PA that could be used as platforms for analysis in the development of a didactic unit on food education in teacher training.

The following is a review of the most significant aspects and their resolutions.

-On the choice of the social network to share each student's registration units

The first implementation of the PeA and PA production methodology was carried out in the framework of a research conducted in 2018, with students from high schools in northern Argentine Patagonia (Bahamonde et al 2021). There, two basic aspects were established in its development: that students would use the Instagram social network for the registration and communication of the commented images, in a private configuration, and that a system of hashtags would be used to characterize various aspects of the content and to facilitate its addressing and processing in the database. These aspects provided a solid basis for informing and re-discussing the design of the methodological approach for the new research project. In this framework, two central aspects were discussed again: the continuity or not with the use of a private and anonymous profile to share the commented images and the continuity of the work on Instagram in the light of a comparative study with other platforms.

Regarding the first question, the axis of the discussions revolved around which of the two options guarantees that students share "more real images" of their eating, since the sense of the organization of the inventory of practices and contexts in PeA and PA to be used in the development of the UD, is to provide scenes that students can recognize as their own and close to what happens daily with their food and not an intervened version due to the level of public exposure that implies "showing what they eat" on a daily basis, that is, practices conditioned by time, academic and/or work activities, economic, family organization, etc. As will be shown in the discussions, an evaluation of the methodology carried out with a sample of participating students at the end of the development of the UD, resulted in a consistent vision with the proposal linked to using Instagram in an anonymous version and different from the one for personal use, which the students possess.

Regarding the second question, a total of six applications were analyzed: WhatsApp, Snapchat, WiSaw, Vero, Discord and Instagram, highlighting both their advantages in facilitating activity and the disadvantages that could hinder it. In this process, priority was given to anonymity, the usability of the application and the ability to form galleries with the participants' annotated images. From the analysis, it was observed that WhatsApp allows forming groups and sharing photos, but lacks anonymity. Snapchat is anonymous but images are deleted after 24 hours. WiSaw offers total anonymity but does not allow closed groups. Vero is anonymous and organizes photos in albums, but is not well known and could present familiarization problems. Discord is also anonymous and allows you to create communities, but it is complex to use and has reliability issues. Within this framework, it was decided to continue using Instagram due to its ease of use and familiarity among students, combined with its ability to maintain anonymity and organize images in galleries. These characteristics made it the most suitable option to carry out this specific activity, guaranteeing efficiency and consistency in data collection, with the condition of using a single account and that everyone install it on their devices and post from it. As each one has a user, which is randomly assigned during the period of organization of data collection, anonymity is maintained, but the profile of each individual who posts can be identified.

-Regarding the previous training that students must have in order to meet the objectives required by the methodology

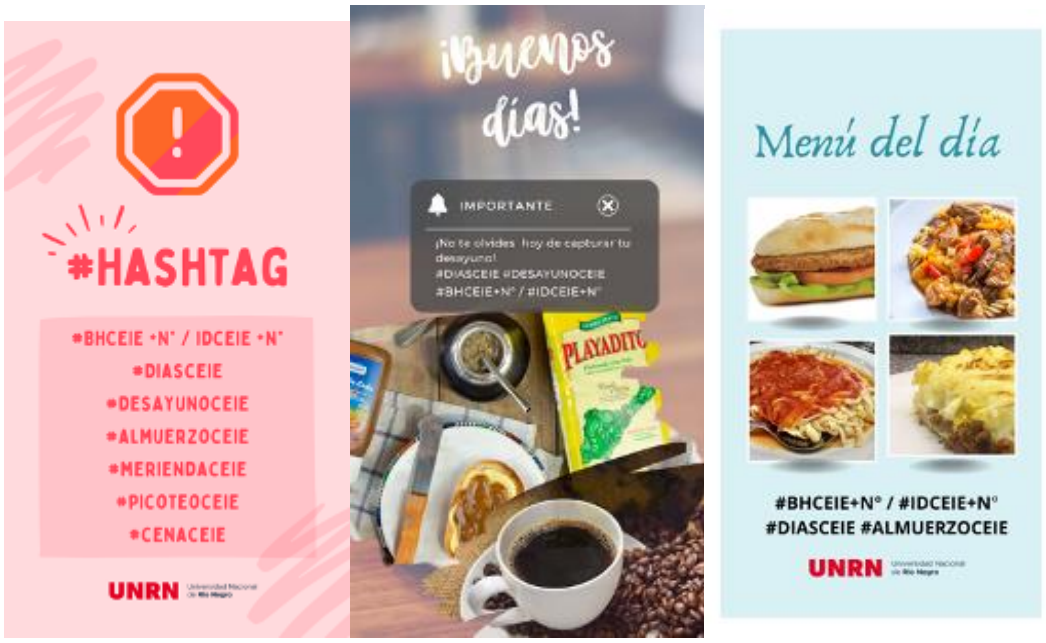
When students are summoned to perform an assignment using social networks, they face a series of obstacles due to the fact that the daily use of these platforms is mainly oriented to recreation and not to the development of academic tasks. This disconnect

between playful and academic use can hinder the effective integration of social networks into learning. This tendency to associate social networks with entertainment may generate resistance or a lack of seriousness when using them for academic purposes, thus limiting their potential as an educational tool (Junco, 2012 Lam; A.H.C., Ho, K.K.W. and Chiu, D.K.W. 2023), In attention to this aspect, and from the difficulties encountered in the implementation of the first version of the methodological device in 2018, it was considered appropriate to develop a brief training program so that students could arrive at the days indicated for the recording and production of the annotated images, with a good understanding of the task to be performed and the sense that the task had.

1. A general introduction to the research project was made. Basically, the general sense of the work to be carried out and the objective of obtaining data that would allow characterizing their eating practices and then being able to use these data in the development of a teaching sequence were presented. Emphasis was placed on the value of educational research in the context of teacher training and on the importance of achieving active and committed participation by the group. At the end of this stage, in which a general introduction of the work methodology was made, all students gave the ok and thus enabled their participation in the task.
2. Students were asked to verify that their cell phones were able to load the Instagram app, and then add a new profile, in this case the one for the research team's joint account.
3. Then, an identification code was randomly assigned to each participant in each subject (in this case, the subjects were coded on the course list based on a number assigned to each subject). It was performed by someone outside the research team and the record was kept on file. Thus, for each post on the common account, the first # they had to place is the subject's ID. (Ex. #BHCEIE15. #BH: student of the Human Biology course. CEIE: Identification of the account of the Center for Studies and Research in Education. 15: The identifying code randomly assigned to the student)
4. Then, to prove that the social network allowed posting from the same user at the same time from different devices, the group of students was asked to synchronously log in and make a post.
5. The use of all the other necessary #'s was also indicated: types of food and commensality data. At that time it was emphasized that forgetting a # implied loss of information.
6. They were informed that on the days destined to produce the images mentioned above, flyers would be uploaded to the account, as alerts, with the tasks for that day. (See image...)
7. Finally, and as a general recommendation, it was emphasized the need for the annotated images that they would elaborate, to stage "the reality of the daily feeding" that they carry out on a weekday and a weekend day, since otherwise, the general objective of the research would be distorted.

Figure 5

Examples of three flyers from the day the fieldwork began. 9 flyers were produced for each work day



-On how to receive and organize the registration units to prepare the APs and OPs

One of the most important modifications of the methodology implemented in the 2018 study was the creation of a database on the university virtual campus for the reception and organization of the annotated images, in an "inventory of food practices and contexts" of students that contains, in addition to each annotated image, the PeA of all students and the PA of all # by type of meal (breakfast, snack, lunch, snack, dinner)

Thus, using the university's virtual classroom, which is hosted on Moodle and has the functionality of the Database activity, allows researchers:

1. Centralization and organization: We have a centralized environment where researchers can store and organize all the fieldwork data and at the same time aggregate the Didactic Unit classes of each of the spaces participating in the research in a single accessible place.
2. Remote access: Being online-based, the UNRN virtual classroom allows researchers to access data from anywhere with an Internet connection, facilitating collaboration and teamwork even at a distance.
3. Ease of search: The Database feature in Moodle allows advanced searches of the data using different criteria, which simplifies the task of finding specific information within large data sets.
4. Security and access control: being on the university campus, the security options were already in place. The researchers controlled who had access to the data and what actions they could take, ensuring the confidentiality and integrity of the information.

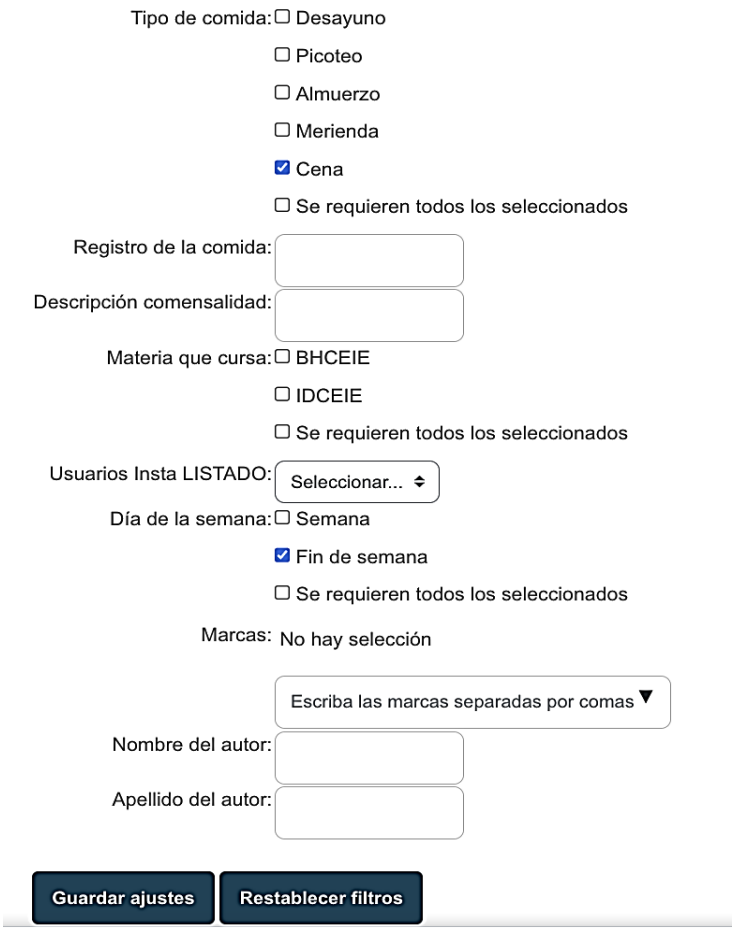
This decision, to dump the information into the campus database, allowed us to organize each post using tags (folksonomy) (See Figure...). This facilitated the search and analysis of the information according to the needs of each researcher, something that was not possible with versions used in the previous fieldwork, such as Google Photos or Flickr. The tags match the hashtags used in the original posts, including the description of the meal, the student's subject, the day of the week of the sample and the type of meal. This flexible organization made it possible to interweave various search criteria in an efficient manner.

This advanced search capability facilitated the construction of the PeA and PA, and easier and faster access to contextualized data, e.g., it was possible to examine students' food preferences according to the day of the week or to identify differences in eating patterns between lunches and dinners. And finally this favored collaboration between researchers, from data uploading to data analysis.

It also presented some disadvantages or obstacles that it is interesting to be able to foresee for another implementation (the need for manual loading of the data, for example, each individual commensality post in the database is a laborious and error-prone process). To avoid errors, a data review and verification process was necessary, consuming additional time and resources. The use of the UNRN platform and the database it offers was undoubtedly central to the development of the research task.

Figure 6

Database screen for access by researchers



Results

About the PeA and PA elaborated

From the implementation of the methodological device, 52 students from two courses of the Biology Teacher Training course, elaborated 360 posts corresponding to all the food episodes of a weekday and a weekend day: 79 breakfasts, 82 lunches, 64

snacks, 75 dinners and 68 hors d'oeuvres. This resulted in the creation of 52 Food Profiles (PeA) and 18 Food Landscapes (PA), corresponding to the categories of #breakfast, #pickle, #lunch, #snack and #dinner. The PeA and PA recording units were printed and available to students at the beginning of the didactic unit activities.

On its use in the implementation of the didactic unit

The PeA and PA were used as input for analysis in the following DU activities:

- Analysis of various APs to open discussions at the beginning of the didactic unit. The students formulate questions and concerns based on the contents of the AP and group them by topic. This gives rise to a first "interdisciplinary Islet of rationality and reasonableness" (Lozano et al., 2016) with dimensions of analysis that go beyond classical health nutritional issues.
- Nutritional bases. Analysis of PeA and PA from "the principles of healthy eating" (balanced/varied diet, proportion/harmony, quantity, adequacy, distribution, water consumption). From the data, graphs similar to those proposed by the Dietary Guidelines for the Argentine population (Ministerio de Salud de la Nación, 2019) are elaborated based on weighting the predominant food groups and comparisons and evaluations are made.
- Socio-cultural bases. Two antagonistic PeA and PA are analyzed from the different discourses on human nutrition (tradition/identity, exotic difference/distinction, progress/modernity, commensality, aesthetics, among others) (Gracias Arnaiz, M., 1996)
- Neurobiological basis. APs are used to select meals and justify the reasons for the choice. This gives rise to the development of complex neurobiological models linked to the bio-psycho-social components of feeding (Beaulieu, K.; Blundell, J., 2021).
- Application activities. A PeA is used to discuss its content from a complex and multi-referenced approach.

Discussions and Conclusions

The results obtained lead us to positively evaluate the methodological device implemented, since it allowed us to have multimodal recording units that illustrated the food practices and contexts of the students themselves. In these registers, "what is eaten" is inextricably linked to "how it is eaten", "in what place", "with whom", and "who prepared it", and this semiotic quality is consistent with the complex approach that guided the design of the didactic unit and also with the theoretical vision adopted on human nutrition.

The PeA and PA also proved to be apt to favor recursive analyses between the identity and the group/community, based on the theoretical models provided by the different dimensions involved in the didactic unit, giving rise to emergents that resignify the feeding scenes that these devices initially portrayed (Figure 7)

Figure 7

Devices, dimensions and recursivity of analysis

Another aspect of interest is related to the level of involvement students have in the task of recording and commenting on their eating practices. We consider that this condition is at the basis of the development of learning motivations, by virtue of the relevance and significance that the content to be analyzed in the classes acquires for them (Tinto, 2021). In order to obtain information on the students' vision, once the implementation of the DU was completed, and based on the development of in-depth interviews with a random sample of 25% of the students, it was possible to highlight some aspects of the methodology used.

The totality of the interviewees expressed positive academic emotions (Pekrun, et al. 2002) and considered the work carried out to be of interest. Table 1 shows some of the students' reflections on this aspect.

Table 1

Students' views on the use of the social network for posting

how did you live the experience of using a social network to post commented images of your meals?	*"I liked that proposal because we could see everyone's meals and it was good because it was also a tool that made it easier for us since we had to upload the images and it was very interesting, I really liked that methodology"*
	"As an experience it was something new, it was a different job that at first I did not make sense, but when I started working with these landscapes in the classroom and the activities that were performed was very interesting, it was a very good experience and I realized in my case how it changes the way we eat when we are accompanied, for example"
	"It was good, it makes you think a little bit about what you're eating, it was a fun experience all in all. It was weird to have to take pictures of the food before eating, but well, maybe because you're not used to it or you don't give much importance to what you eat"

	"It was pretty straightforward and fun. It was also good to compare the meals of a colleague who is on a diet, who has little time, who comes to study and that was good when we were in a group and we discussed these things."
	"Yes I liked it, I liked the implementation of that DU but it was true that there were times when I ate late and I forgot to take the picture and it was like I had to serve it again on the plate to make it look good for the picture."

Another issue that was inquired about, was related to the condition of working in an institutional and shared Instagram account and not in the personal one of each one of them. Also, all the students stated, to a greater or lesser extent, that they would have introduced changes to the commented images, basically, to improve the photos by using filters, making it explicit that it was an academic task, or modifying the content of the meals to project a healthier image. These data validate the methodological option of carrying out the work under privacy conditions.

Table 2 shows some of the students' reflections on this aspect.

Table 2
Student reflections on the use of personal Instagram account.

if you were to use your personal Instagram to accomplish the same task, would you modify anything?	*"And it depends on how one always shows up. If you don't hide, that is... if you are transparent, I don't think so, but well, the social network allows you to show something... what to show and what not to show, that's what it has, so yes, it would have been different from my profile"*
	"No, but in the description of each photo I would have put that it was a faculty activity, the name of the subject and so on, but then nothing. I wouldn't have put a filter or anything, because the purpose of the activity was to be honest about what you ate. I'm also not worried about what my followers might think about what I upload."
	"No, I would still be honest with my food, maybe not, if I had changed, but more than anything the way of taking the picture, setting the table, the plate, so that it comes out better. I wouldn't have added emojis or anything like that, but maybe a filter to intensify the colors of the food, but the food itself will remain the same."
	"I think posting pictures of the food I was eating on my own Instagram would have made me change what I was eating a little bit, I don't know, make it look a little bit healthier or make what I was eating look better."

> *"If given a choice I wouldn't have done it, but in case I had to do it again on my Instagram, I'd probably put some filter on it, I'd sort things more aesthetically pleasing."*

In this line, it would be of interest to open a new dimension in future research, related to the description and analysis of everything that students think, feel and communicate in the period in which they are making records of food episodes to send to the database. Our hypothesis is that, from that moment on, students begin to develop an inquiring, critical and complex view of their food.

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Gamification in English Language Teaching: A Didactic Proposal for Primary Education

GAMIFICACIÓN EN LA ENSEÑANZA DEL INGLÉS: UNA PROPUESTA DIDÁCTICA PARA EDUCACIÓN PRIMARIA

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ABSTRACT

This article presents research focused on the design of a didactic unit that uses gamification as an educational strategy for teaching English at the primary education level. Through a comprehensive literature review, the relevance of gamification in language teaching is reflected upon, good practice cases are analyzed, and specific didactic materials and resources are developed. The methodology is based on a qualitative and descriptive approach, utilizing various bibliographic, documentary, and digital sources to gather relevant information. The results highlight that gamification proves to be an effective and motivating didactic strategy for primary education students, significantly enhancing their English learning process. Furthermore, it stimulates active participation, the development of communicative skills, intercultural competences, as well as fostering creativity and imagination. In summary, the study demonstrates that gamification in English language teaching at the primary education level is an innovative and beneficial pedagogical tool for the educational process of students at this level.

Palabras clave:
gamificación, inglés, Educación Primaria, metodologías activas, aprendizaje basado en juegos

RESUMEN

Este artículo presenta una investigación centrada en el diseño de una unidad didáctica que emplea la gamificación como estrategia educativa para la enseñanza del inglés en el nivel de educación primaria. A través de una revisión exhaustiva de la literatura, se reflexiona sobre la relevancia de la gamificación en la enseñanza del idioma, se analizan casos de buenas prácticas y se desarrollan materiales y recursos didácticos específicos. La metodología utilizada se basa en un enfoque cualitativo y descriptivo, haciendo uso de diversas fuentes bibliográficas, documentales y digitales para recopilar información relevante. Los resultados obtenidos destacan que la gamificación se revela como una estrategia didáctica efectiva y motivadora para los estudiantes de educación primaria, mejorando significativamente su proceso de aprendizaje del inglés. Además, se observa un estímulo en la participación de los alumnos,

	el desarrollo de habilidades comunicativas, competencias interculturales, así como un impulso en su creatividad e imaginación. En resumen, el estudio evidencia que la gamificación en la enseñanza del inglés en educación primaria es una herramienta pedagógica innovadora y beneficiosa para el proceso educativo de los estudiantes en este nivel.

Introduction

Gamification is defined as "the use of game design elements and techniques in non-game contexts in order to increase user participation, motivation and engagement" (Deterding, Dixon, Khaled, & Nacke, 2011, p. 9), these authors emphasize that gamification involves the application of game concepts and mechanics, such as competition, achievements, levels, challenges and rewards, in areas beyond entertainment, such as education, marketing and personal development. According to these authors, the goal of gamification is to foster specific behaviors, encourage participation and generate an engaging experience for users.

On the other hand, Zichermann and Cunningham (2011) offer a broader definition of gamification, describing it as "the use of game mechanics and game design elements in non-game situations to engage people and solve problems" (p. 9). These authors emphasize that gamification goes beyond simply adding game elements, as it involves the intentional design of motivating and immersive experiences. According to Zichermann and Cunningham (2011), gamification can have a significant impact in areas such as learning, health, business and social interaction by promoting engagement, desired behavior and problem solving through the use of rewards, feedback and structured challenges.

Gamification in primary education is booming due to the growing interest of students in games and interaction with technology. This active methodological strategy consists of applying game elements and principles to learning, with the objective of motivating students, encouraging competition and cooperative work, and providing feedback. We must emphasize that gamification in education incorporates game elements and mechanics into the teaching-learning process, which contributes to improving the acquisition of curriculum competencies and combating disengagement, lack of motivation and resistance to further education.

It is also important to note that gamification is not just a game for fun, but also has educational purposes. The elements of the game are used to develop specific curricular content in a given context, adapting the tasks and activities to the dynamics of the game.

As for the types of gamification, there is game-based learning (ABJ), which uses games as a didactic tool generating positive emotions in students and adapting to different objectives. The EDU breakout consists of activities that incorporate elements of the game and aim to open a box with padlocks by overcoming missions or challenges. The escape room uses game elements in challenges to promote critical thinking, where students must solve tests or enigmas through clues in order to escape from a room and reach the final objective.

To better understand gamification, it is useful to know the elements that compose it. According to Werbach and Hunter (2012), they are divided into three categories: dynamic, mechanical and component (DMC). These elements provide a framework for structuring the design of interactive game processes and gamified dynamics.

Dynamic elements play a fundamental role in educational gamification, as they refer to the desires and needs that motivate students to participate in the learning process. These elements include norms and rules that provide structure to the gamified activity, generating a clear and defined environment for students (Werbach and Hunter, 2012). In addition, the emotions experienced during the game and coherent narratives that contextualize the learning arouse students' interest, keeping them engaged and motivated (Deterding, Dixon, Khaled, & Nacke, 2011).

On the other hand, the mechanical elements are the specific actions designed to satisfy the dynamics proposed in gamification (Dichev and Dicheva, 2017). These actions

may include challenges or challenges that students must overcome, which generates a sense of success and achievement upon reaching them (Kapp, 2012). It is important that these challenges have an appropriate level of difficulty to keep students engaged and avoid frustration (Landers, 2014). In addition, incorporating elements of luck and chance into gamification can add excitement and surprise, which increases student motivation and engagement (Deterding et al., 2011). Instant feedback is also essential in gamification, as it provides immediate feedback on students' progress and performance, helping them to identify areas for improvement and reinforce their learning (Hamari, Koivisto, & Sarsa, 2014). Likewise, rewards are a key element in gamification, as they are obtained as a result of success in the game and function as an incentive to reinforce achievements and reward the effort made by students (Nicholson, 2015).

The component elements, on the other hand, are the visual tools and resources used in educational gamification (Deterding et al., 2011). These elements include avatars, collections, levels and equipment. Avatars allow students to customize their digital representation in the game, which helps them establish an emotional connection with their character and increase their sense of identity and belonging (Nicholson, 2015). Collections, on the other hand, represent the achievements made by students, giving them a sense of progress and accomplishment as they progress through the game (Kapp, 2012). The levels increase in difficulty progressively, challenging students to overcome increasingly complex challenges, which promotes self-improvement and skill development (Hamari et al., 2014). Finally, teams foster collaboration and interaction among students, allowing them to work together to achieve common goals and promoting cooperative learning (Deterding et al., 2011).

In conclusion, dynamic, mechanical and component elements are essential components in educational gamification. These elements combine to design an interactive process that motivates students, provides constant feedback, generates a sense of achievement, and promotes collaboration and self-improvement. Proper integration of these elements in gamification can increase student engagement, motivation and learning.

Looking at gamification from the teacher's perspective allows us to understand that this technique cannot only be used by game creators. After going a long way and getting closer to the goal, it is evident that the potential that gamification offers to the educational field is remarkable. The creation of a gamified project can be considered an excellent tool to promote meaningful and lasting learning over time, which nowadays translates into lifelong learning.

Gil-Quintana and Prieto (2020) list the multiple advantages that gamification as a strategy brings to education, highlighting the increased participation and engagement of the group of students, as well as their interaction in the classroom. In addition, these gamified experiences increase motivation towards learning in a playful and fun way.

Thanks to gamified experiences, learning becomes a less conscious and, therefore, more productive process, as students feel that they are playing instead of studying, as supported by Gil-Quintana and Prieto (2020, p. 120). This ensures a better understanding of the subject matter, as the educational content is embedded in a gamification structure.

Borrás (2015) adds a third crucial component: the development of learner autonomy. The creation of autonomous learners capable of evaluating, managing and synthesizing their own learning process represents one of the greatest challenges for education today. The use of gamification in the classroom, an active methodology that enhances student engagement with their own learning, will help meet this demand.

In the same vein, Furdu, Tomozei, and Köse (2017) emphasize the importance of obtaining constant and immediate feedback during the learning construction process. What they call "instant feedback" favors the autonomous development of each learner

without hindrance, as gamification provides clear and identifiable metrics that inform the participant's progress. Both the teacher and the student have access to instantly generated data, which allows for corresponding feedback for both achievements and mistakes or defeats.

In relation to the above, Furdu et al. (2017) highlight the importance of students viewing error as an opportunity rather than diminishing their motivation and generating feelings of cowardice or fear toward the activity. McGonigal (2012) highlights the power of recognizing in a way

positive feedback from failure reinforces our sense of control over the outcome of the game. And the feeling of control in a goal-oriented environment can generate strong motivation to succeed" (p. 67).

Finally, in terms of advantages, Rodríguez, Ramos, Santos and Fernández (2019) mention the narrowing of the gap that usually exists among students due to diversity. The incorporation of Information and Communication Technologies (ICT), in general, and gamification, in particular, has contributed greatly to reducing the marginalization and social exclusion often faced by students with difficulties or special needs. According to Rodríguez et al. (2019), these gamification-based dynamics allow the individualization of cognitive processes, adapting to different learning and communication rhythms and styles.

Based on these contributions, it is concluded that the use of gamification-based situations can be considered a tool for all educational agents and mark a change in the classroom approach. However, it is a common misconception that its use is completely ingrained in the current teaching model, which is untrue.

On the other hand, Gil-Quintana and Prieto (2020) warn that gamification is still a very new discipline, as teachers are just beginning to become familiar with this approach or are still trying to understand what the concept of gamification implies compared to other active methodologies. Fernández-Cruz and Fernández-Díaz (2016) point out, firstly, the insufficient digital competence of the teaching staff in relation to Information and Communication Technologies and their application in the classroom, and secondly, the lack of security arising from the uncertainty caused by a constantly changing technological society. The main reason lies in the fact that most educational agents in schools are still anchored in a very specific didactic model that fails to fully adapt to the new teaching methodologies.

In addition, González (2014) points out that, although the technological dependence in gamification varies, in most cases, the use of computer material and its maintenance are indispensable for its correct implementation. These technical needs require a costly investment that not all schools can afford.

In this sense, we have to highlight the importance of gamification and teaching English in primary education, supported by scientific studies from 2018 to 2021, lies in several key aspects. First, according to the research of Dicheva et al. (2019) and Mekler et al. (2018), gamification offers benefits and advantages that foster personal and social learning development. Through this methodology, student motivation is increased, following the conclusions of Morschheuser et al. (2020), as play is often attractive and fun for them, which increases their willingness to learn. In addition, the flexibility of gamification, as mentioned by Barata et al. (2019) and Hamari et al. (2018), allows to adapt to the different working rhythms of students and to be applied in all areas, which facilitates the learning of abstract content in a practical way.

Immediate feedback in gamification also plays an important role, according to research by Sailer et al. (2017) and Domínguez et al. (2018), as it corrects students' mistakes and doubts instantly, which makes learning more meaningful. Likewise,

gamification encourages active participation and meaningful learning, following the theories of Bruner (2018) and Vygotsky (2019), by making the learner the protagonist of his own learning process, stimulating his ability to discover and act on his own. This helps them retain the acquired knowledge in their long-term memory, thanks to constant feedback, according to the findings of Hays (2018) and Mayer (2019).

Another relevant aspect, supported by the studies of Johnson et al. (2019) and Khalil et al. (2020), is that gamification promotes group cooperation, as learners must discuss, talk and make decisions together to achieve common goals. This peer collaboration and communicative exchange, following the theories of Bandura (2018) and Piaget (2019), strengthen interpersonal relationships, improve classroom performance and work environment, and enhance the acquisition of social and individual skills, as well as companionship.

In the specific case of English language teaching in primary education, gamification becomes a methodology supported by the studies of Lee (2018) and Sharma et al. (2020), which promotes the learning of this language through the use of games. Its playful approach, according to the findings of Huizenga et al. (2017) and Sengün et al. (2019), captures students' interest and facilitates the acquisition of knowledge in a more fun way. By employing gamification in English classrooms, following the research of Neumeier (2021) and Rankin et al. (2020), collaboration, motivation and student interaction are promoted, improving written, reading, listening and oral comprehension skills.

In this sense, we have reviewed some gamification projects taken to classrooms in Spain to understand their objectives and the strategies followed to implement them in the classroom. Thus, the first gamified project called "Super CVE" was carried out in a school in Boadilla del Monte in Madrid, called Virgen de Europa. The experience lasted four months with students in the 1st and 2nd years of primary education in the areas of English, mathematics and other interdisciplinary subjects and consisted of creating avatars, obtaining points by completing missions and obtaining rewards. The objectives were to work as a team through cooperative roles, to give individual responsibilities to students and to increase participation in the units of inquiry (Magisterio, 2021).

A second project was in the Novaschool Añoreta school in Malaga in Primary Education and was called "Accompany Telmy in his adventure through the planet Earth" and was directed on the one hand to students in the 2nd year of Primary Education whose objectives were to facilitate learning in mathematics, motivate through play, encourage the use of ICT, achieve meaningful learning and work on environmental education and knowledge of the environment. On the other hand, it was aimed at students from 1st to 4th grade with the objective of promoting the pleasure of reading and calling the project "Leemos con Telmy" (We read with Telmy). As students finished their lesson, they received soap bubbles that they could exchange for puzzle pieces to solve the different riddles (Novaschool, 2021).

A third project was carried out at the Sagrada Familia school in Elda, Valencia, and was aimed at students in 5th grade of primary education. Its objective was to expose the contents in a fun and attractive way, promote teamwork, develop basic communication skills, delegate and solve problems in groups or individually, increase logical thinking, deductive reasoning and creativity.

Another gamified project was carried out in Navarra at the Regina Pacis school in the town of Burlada for the 3rd year of Primary Education in the area of Social Sciences and was entitled "The lost astronaut". The idea was to overcome challenges that incorporated the game to learn and investigate about the Solar System, promoting the use

of ICT and student motivation. It used a common thread and different challenges had to be overcome in order to obtain rewards and save the astronaut (Lucas and Arana, 2022).

A new gamified project was created jointly by faculty and students of the University Center of SAFA Úbeda and was called "The evolution of the human species". It was carried out by more than 500 educational centers in Spain and other countries. The objectives were to coordinate and create an interdisciplinary project for teachers, families and students, foster group work and inclusion, generate motivation and interest in research, and achieve learning based on the experience of play.

The last gamified project was carried out at the Sagrada Familia school in Andújar, Jaén, for students in the 2nd year of Primary Education in the areas of Natural Sciences and Social Sciences. This project carried out different designs of educational digital breakouts to motivate and involve students, develop digital knowledge and skills, encourage critical thinking and problem solving, promote cooperative work and achieve effective learning (Moreno and Lopezosa, 2020).

Method

As part of the educational innovation initiative, the design and creation of specific teaching materials and resources aimed at gamification in English language teaching was undertaken in the past. This process, meticulously executed, involved adapting the materials to the particular needs and characteristics of the students. The development of these resources took into account the integration of ludic, technological and interactive elements, seeking to generate a stimulating and meaningful learning environment.

The design of the materials was characterized by a careful sequencing of activities, the selection of relevant content and the incorporation of game elements aimed at actively motivating students. Consideration of these aspects not only ensured pedagogical coherence, but also aimed to maximize student participation and engagement in the learning process.

Once the design phase was completed, the didactic unit was implemented in the classroom, bringing the gamification strategy to life. During this stage, various activities and dynamics designed to encourage the active participation of students, the use of technology, collaboration among peers and the development of communication skills in English were carried out. The successful implementation of gamification in the classroom allowed for the configuration of a dynamic and motivating learning environment, where students were enthusiastically involved in the acquisition of knowledge related to the past in this first foreign language.

As an integral part of the process, a comprehensive evaluation of the effectiveness of gamification as a teaching strategy was conducted. Data were systematically collected, and the results obtained were analyzed in order to gain an in-depth understanding of the experience. The conclusions derived from this evaluation made it possible to identify not only the strengths and limitations of the implementation of gamification in the classroom, but also specific areas that required improvement. This critical analysis provided valuable information on the impact of gamification on student learning, as well as on the effectiveness of the materials and resources designed, offering significant insights for future implementations and improvements in the pedagogical approach adopted.

Results

The learning situation focused on the exploration of ancient civilizations of the past, particularly in the Andalusian provinces of Jaen, Cordoba and Seville, integrating the teaching of English with the grammatical structure of the simple past. The timing of the project covered 8 sessions of 1 hour. It began with the detection of students' previous ideas about great monuments and travel, using reflective questions to stimulate participation. The initiative was justified by taking advantage of the upcoming field trip, in which students would explore monuments and sculptures in various Andalusian provinces, linking this experience with the grammar of the simple past in English.

The final product consisted of the creation of an interactive map in My Maps, where the students, divided into groups, researched and selected relevant monuments in the cities visited. This map, shared on a collaborative website, allowed for the final presentation and presentation to their peers. Task 1, "Monument Quest", involved placing cards with monuments on a physical map, promoting the correct identification of monuments representative of each civilization in the provinces of Jaen, Cordoba and Seville.

Task 2, "Discovering Ancient Civilizations in Jaén," extended the project through a game called "Monument Match," where students matched monuments with civilizations and located them on My Maps. Task 3, "Discovering the monuments of Córdoba", extended the experience to the province of Córdoba, involving students in research and presentations on assigned monuments.

Task 4, "Escape Room. The Mystery of the Lost Treasure", introduced an escape game dynamic to solve riddles and find clues related to monuments, encouraging problem solving, collaboration and creativity. Task 5, "Ready to Ride," incorporated the board game Ticket to Ride, where teams connected cities by answering questions about monuments and civilizations, adding a playful dimension to learning. Finally, the final task, "My Maps", consisted of the exhibition of the digital maps created by the groups, evaluating the understanding, collaboration, presentation and effective use of the My Maps tool.

Finally, it should be noted that the curricular specification was supported by Andalusian regional regulations, such as Decree 101/2023, the Order of May 30, 2023 and Instruction 12/2022. Specific competencies included comprehension and production of texts, social and cultural interaction, measurement of predictable situations, recognition of linguistic repertoires and appreciation for diversity.

At the educational level, the educational experience effectively integrated the grammar of the simple past in English with the study of ancient monuments and civilizations in Andalusia. The varied and creative tasks not only fostered language learning, but also social, cultural and technological skills, contributing to a comprehensive educational experience.

Evaluation of educational practice

The implementation of various activities in the classroom entails the need to use specific evaluation instruments to measure student performance and participation, as well as to evaluate the effectiveness of teaching practice. In this context, the instruments used for five specific activities developed in the educational field are described in detail.

The first activity, called "Monument Quest", focuses on the location of monuments in Jaén, Córdoba and Seville through cards and maps. The evaluation instruments include direct observation during group activities, where the teacher evaluates student participation, collaboration, communication and problem solving. In addition, an

individual written record of the monuments identified is used, where each student must provide the name, location and a brief description of the monuments.

The second activity, entitled "Discovering Ancient Civilizations in Jaén", involves the investigation and presentation of ancient civilizations through interactive maps. The evaluation instruments include direct observation during the development of the activities, evaluating the involvement, cooperation, search for information and use of ICT by the students. A rubric is also introduced to evaluate the quality, originality, accuracy and presentation of the interactive maps produced by the groups.

The third activity, "Discovering the Monuments of Cordoba", proposes to visit and learn about the monuments of Cordoba, followed by an oral presentation in English. Here, the evaluation instruments include direct observation, rubric for interactive maps and an additional rubric to evaluate oral presentations. These criteria include the quality, fluency, pronunciation and vocabulary of the presentations, ensuring a complete and detailed evaluation.

The fourth activity, "Escape Room: The Mystery of the Lost Treasure," features a focus on solving puzzles and searching for clues in Seville. The evaluation instruments involve direct observation of the teams' performance, recording of times and results, a questionnaire to evaluate participants' satisfaction and learning, and self-evaluation or co-evaluation of the roles played by each team member.

Finally, the fifth activity, "Ready to travel," requires teams to complete a journey through Andalusia by connecting cities and answering questions about monuments and civilizations. The evaluation is carried out through direct observation, recording of times and results, a questionnaire to evaluate satisfaction and learning, and self-evaluation or co-evaluation of the roles played by each member of the team.

In each activity, detailed planning and a variety of evaluation instruments covering aspects such as participation, technical skills, creativity, communication and teamwork are evident. These instruments contribute to a comprehensive evaluation, allowing the teacher to obtain an accurate understanding of the students' performance and the effectiveness of the proposed activities. In addition, they encourage self-evaluation and co-evaluation, promoting reflection and the development of metacognitive skills in students. In summary, the implementation of these activities with their corresponding evaluation instruments offers a complete and balanced approach to evaluate both learning and teaching practice in the educational context.

Conclusions

Gamification, as a didactic strategy, has proven to be an effective and motivating tool to improve the teaching-learning process in the area of Foreign Language (English) with 5th grade students. By analyzing the results and considering the implementation of this innovative educational practice, it is possible to establish connections with previous research and cite studies that support the benefits of gamification in education. This evidence-based approach underlines the importance and relevance of gamification as an educational strategy in the current context.

One of the most outstanding contributions of this project has been the significant improvement in student motivation. Gamification has created a stimulating and engaging educational environment, capturing students' attention and encouraging their participation. In the words of McGonigal (2012), "games are the most powerful driver of engagement" (p. 71), suggesting that gamification can act as an effective catalyst for maintaining students' attention.

In addition, the results of this study support previous findings suggesting that gamification can have a positive impact on students' academic accountability. According to Hamari, Koivisto, and Sarsa (2014), "gamification can increase intrinsic and extrinsic accountability by providing immediate and visible feedback, setting clear and challenging goals, and offering rewards" (p. 6). This work corroborates these observations by evidencing improvements in academic accountability as measured by student participation and engagement with gamification.

Another relevant aspect of this research is the positive impact on the development of basic language skills. Gamification has created an environment where students express themselves and communicate in English more fluently. Coinciding with the results obtained, Steinkuehler and Duncan (2008) emphasize that "games can offer unique opportunities to practice language and communication skills" (p. 526). This observation supports the idea that gamification can be a valuable resource for enhancing communicative skills in foreign language learning.

When evaluating group collaboration, it was observed that gamification fostered teamwork and cooperation among students by assigning specific roles to each group member. Here, Johnson, Johnson, and Holubec (2013) suggest that "positive collaboration can be enhanced by assigning specific roles and clarifying goals" (p. 83). The structuring of roles in gamification, such as leader, researcher or communicator, has helped to improve collaboration and communication among students.

However, it is crucial to recognize the limitations encountered in this study. The time constraint for a complete implementation and the adaptation of didactic resources to the specific characteristics of the students point out areas for improvement and direct future research. In the words of Deterding, Dixon, Khaled, and Nacke (2011), "gamification is an emerging area that requires more rigorous research to fully understand its impact and potential" (p. 11). This recognition of limitations aligns our work with the need for ongoing and detailed research in the field of gamification.

As for future prospects, there are exciting opportunities to further explore gamification as a teaching strategy in a variety of areas and subjects. Evaluating the long-term impact of gamification on learning and skill development is a direction suggested by researchers such as Hamari, Koivisto, and Sarsa (2014), who state that "longitudinal research is needed to assess the long-term impact of gamification" (p. 11). This indication reflects the importance of considering gamification not only as an immediate solution, but as a tool with lasting potential in the educational process.

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Exploring Cultural Borders: A Study on English Textbooks in Chilean Basic Education and Their Alignment with International Standards

Explorando Fronteras Culturales: Un Estudio sobre los Textos de Inglés en la Enseñanza Básica Chilena y su Alineación con Normativas Internacionales

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ABSTRACT

The objective of this article is to analyze the alignment of English textbooks used in primary education in Chile with international regulations that promote cultural diversity, dialogue between cultures, and an inclusive and intercultural society. The importance of improving the contents of these books is highlighted to guarantee a more inclusive education aligned with international standards of diversity and educational rights. The methodology used combines content analysis techniques with a contextualized approach in relevant international regulations. An analysis of the texts used in public schools from first to eighth grade was carried out, using reports, specialized literature, and international guidelines as a framework of reference, including documents from UNESCO, ECLAC, and children's rights.

The results indicate that only some texts adequately comply with including intercultural aspects. For example, second and seventh-grade books connect effectively to students' everyday lives by addressing cultural diversity in authentic ways. However, a lack of focus on promoting intercultural dialogue is observed in most of the books analyzed. These findings underline the importance of improving textbook content to develop intercultural competencies among students. It is essential that these materials adequately reflect cultural diversity and promote dialogue between cultures to ensure a more equitable education. It is recommended to implement effective teaching strategies to address interculturality in the design and development of educational materials.

Palabras clave:
libro de textos de inglés, educación intercultural, enseñanza del inglés, competencias interculturales.

RESUMEN

El objetivo de este artículo es analizar la alineación de los libros de texto de inglés utilizados en la educación primaria en Chile con normativas internacionales que promueven la diversidad cultural, el diálogo entre culturas y una sociedad inclusiva e intercultural. Se destaca la importancia de mejorar los contenidos de estos libros para garantizar

	una educación más inclusiva y alineada con estándares internacionales de diversidad y derechos educativos. La metodología empleada combina técnicas de análisis de contenido con un enfoque contextualizado en normativas internacionales relevantes. Se realizó un análisis de los textos utilizados en escuelas públicas de primero a octavo grado, utilizando informes, literatura especializada y directrices internacionales como marco de referencia, incluyendo documentos de la UNESCO, la CEPAL y los derechos del niño. Los resultados indican que solo algunos textos cumplen adecuadamente con la inclusión de aspectos interculturales. Por ejemplo, los libros de segundo y séptimo grado establecen una conexión efectiva con la vida cotidiana de los estudiantes al abordar la diversidad cultural de manera auténtica. Sin embargo, se observa una falta de enfoque en promover el diálogo intercultural en la mayoría de los libros analizados. Estos hallazgos subrayan la importancia de mejorar los contenidos de los libros de texto para desarrollar competencias interculturales entre los estudiantes. Es esencial que estos materiales reflejen adecuadamente la diversidad cultural y promuevan el diálogo entre culturas para garantizar una educación más equitativa. Se recomienda implementar estrategias didácticas efectivas para abordar la interculturalidad en el diseño y desarrollo de materiales educativos.

Introduction

The collaboration between the government of Chile and the UN in the field of education is active and aimed at improving education in the country, aligning with international commitments and the principles of sustainable development and human rights promoted by both the UN and the Chilean Ministry of Education (2018). This effort focuses on fostering social inclusion and recognition of cultural diversity, key elements for development, as highlighted by the Economic Commission for Latin America and the Caribbean (ECLAC), which works to address the diverse realities of multicultural societies (ECLAC, 2018).

Despite efforts to promote diversity, English textbooks in Chile do not adequately recognize diverse cultural realities, highlighting the need to address this gap. This study aims to verify the lack of alignment between English materials in basic education and international regulations, such as UNESCO's Universal Declaration on Cultural Diversity and the International Convention on the Rights of the Child, ratified by Chile in 1989 (n.d.). It is hoped that the findings will help define responses for the Chilean educational system to comply with these commitments and promote the integration of intercultural content in English textbooks.

The UNESCO Universal Declaration on Cultural Diversity (n.d.) establishes key principles for promoting interculturality in education, underlining the importance of inclusion, respect and appreciation of all cultures (UNESCO, 2006). In turn, the Convention on the Rights of the Child requires that educational materials reflect this diversity and promote respect between cultures, guaranteeing the right of the child to an education that fosters his or her development and ability to contribute to a society based on understanding and peace (*United Nations General Assembly*, 1989)

ECLAC, as a regional agency of the United Nations, addresses the issue of interculturality in education to promote economic and social development in Latin America and the Caribbean (ECLAC, 2018). It highlights cultural diversity as an essential asset for the region and advocates policies and programs that promote interculturality in education, recognizing the importance of teacher training, the development of diversity-sensitive educational materials and the participation of indigenous and Afro-descendant communities in educational decision-making. Interculturality in education is presented as a means to build fairer and more democratic societies by promoting equality and valuing diversity as fundamental elements for regional development. This study is framed within this international context, seeking to identify and address deficiencies in the alignment of English textbooks used in Chilean primary education with these international standards and commitments. The results are expected to contribute to strengthening intercultural education in Chile, improving both the quality of English language teaching and its relevance in a multicultural world, and contributing to the empowerment of students in their role as future global citizens.

Literature Review

The teaching of English in Chile is key to global communication and understanding of cultural boundaries, connecting the country with the English-speaking world. However,

research on the alignment of English texts with international standards is limited, highlighting the need to explore how these materials address the cultural complexities of the Chilean context. This study seeks to fill that gap by aligning English language teaching with international guidelines from the UN, UNESCO, ECLAC and the Convention on the Rights of the Child. The goal is to ensure that the texts not only teach the language, but also promote an inclusive, equitable and culturally diverse education.

The choice of these regulations is based on their relevance to the Chilean educational context and their focus on fundamental aspects such as educational equity, the integral development of students and the promotion of cultural diversity. This table provides a solid framework for evaluating how English texts can foster a deeper and more respectful understanding of different cultures and perspectives. The literature review below will provide a broader theoretical context for this study, exploring studies related to curriculum alignment in English language teaching and highlighting the importance of considering international cultural and normative dimensions in the design and selection of educational materials in the Chilean context.

This transformation in education, according to Banks (2021), seeks to ensure equity and expand educational opportunities for all students. The integration of cultural content in the school curriculum is key to enriching the understanding of fundamental concepts in various disciplines. However, this integration must be smooth and consistent, avoiding any sense of artificiality or forcing, especially in areas less explored in terms of cultural diversity, where educators face additional challenges in finding and using cultural materials in a meaningful way. Thus, the development of educational materials that integrate interculturality in a harmonious way is essential to achieve an inclusive and representative education, which not only teaches language, but also universal values of respect and mutual understanding

Therefore, teachers should strive to carefully select the cultural content they use, ensuring that it is integrated coherently with the curriculum and relevant to the learning objectives. It is important to recognize that these opportunities are not evenly distributed across all disciplines. In areas less explored in terms of cultural diversity, educators may face additional challenges in finding and using cultural materials in meaningful ways (Banks, 2021, p. 44).

Therefore, educational programs should foster environments that respect and value diversity in all areas of knowledge, ensuring an inclusive education that reflects the diversity of our society. In addition, institutions are required to develop strategies that promote inclusion and strengthen learning spaces where students from different backgrounds and conditions coexist without discrimination, as established by the Inclusion Law No. 20,845 (Official Gazette of the Republic of Chile, 2015).

In multicultural societies, intercultural interaction is less common and cultural identity is threatened, according to Gómez and Hernández (2022). This highlights the importance of cultural pluralism and the need for ethical approaches in intercultural education. Teaching a second language, such as English, from an early age offers a valuable opportunity to promote respect for cultural diversity. English textbooks used in basic education play a key role in promoting a broader understanding of different cultures (Troncoso, 2018). This pedagogical approach not only promotes language learning, but also helps to compensate for the loss of cultural identity and to strengthen intercultural understanding in societies where interaction between different groups is less frequent.

A recent study by Lu et al. (2022) investigated cultural sustainability in English as a foreign language textbooks by analyzing the cultural representations present in pedagogical resources used in China for high school students. This research provides an overview of how educational texts reflect and promote cultural diversity. The article,

entitled *"The cultural sustainability in English as foreign language textbooks: Investigating the cultural representations in English language textbooks in China for senior middle school students"* examined how these educational materials portray different cultures and how these representations may influence students' cultural perceptions. The most salient result of this study was that it provided important insights into how textbooks can impact understanding and attitudes toward cultural diversity among high school students in China.

Within this framework, language learning involves developing the ability to express and construct social and cultural identities through the promotion of critical cultural awareness and global citizenship (Xiong, Feng, & Hu, 2022). In addition to using textbooks and learning resources as a means of transmitting cultural knowledge and values, this domain can benefit from prolonged and consistent efforts to explore products and processes related to curriculum, teaching patterns, materials, classroom interactions, assessments, production, consumption and interpretation of cultural and ideological values (p.13). Consequently, English textbooks in primary education emerge as key instruments for fostering intercultural competencies among students. However, the lack of knowledge about cultural values and phenomena among students is a significant challenge. It is essential that teachers and the management team of educational institutions working in this context receive training to address these sociocultural challenges and promote greater awareness within the international classroom (Van Rompay and Bartels and Geessink, 2023. p.14).

In this regard, Liang and Schartner (2022) noted that although students engage in altercations within small groups in the classroom, they also recognize the advantages of collaborating in multicultural teams. This occurs despite the fact that conflicts and disagreements often arise due to the confrontation of diverse cultures and values (p. 7).

On the other hand, Smaoui (2022) highlights the importance of explicitly including intercultural competence in the curricula and programs for teaching English as a foreign language. It also highlights the need to provide ample opportunities for hands-on learning to foster optimal development of this competency (p. 87). This is consistent with the recommendations of Li and Longpradit (2022), who point to the positive effect of formal learning on the development of intercultural sensitivity. Both authors stress the need to provide practical opportunities and adequate guidance from teachers to optimize the development of intercultural competencies among students (p. 15).

Similarly, Gedik Bal and Savas (2022) highlight the concerns of teachers in public schools regarding the cross-cultural teaching of English, emphasizing the need for more resources and professional development to foster cross-cultural competence. They also stress the importance of promoting critical cultural awareness among students.

These findings are consistent with research by Aski, Jiang, and Weintritt (2023), which demonstrates that integrating cross-cultural activities into language instruction in primary education can enhance students' intercultural development. This underscores the relevance of using appropriate pedagogical resources to foster intercultural competence in the language classroom.

Method

This study used a qualitative approach based on content analysis to evaluate English texts in primary education in Chile, from 1st to 8th grade, using the latest edition published in 2018 to date. The representation of intercultural competencies in the materials of the Richmond publishing house and Ediciones SM Chile S.A. was analyzed, focusing on the identification of recurring themes and key patterns in relation to cultural

diversity. This qualitative method made it possible to understand how the texts address interculturality, helping to evaluate the inclusion of cultural diversity in educational resources.

In order to establish the categories and indicators for content analysis, a review of reports, specialized literature and guidelines issued by renowned international organizations has been carried out for the creation of a checklist to evaluate English texts, we chose to rely on recognized international frameworks, such as those provided by UNESCO, ECLAC and the rights of the child. These sources help us to address key issues related to educational quality, cultural diversity and student rights. In this way, we ensure a thorough and complete analysis of the texts, aligned with standards that have strong international support.

Below are the indicators derived from ECLAC (2018) guidelines to assess the compliance of texts with international standards.

Promotion of Social Inclusion and Cultural Diversity

The text should reflect the United Nations commitment to social inclusion and the recognition of cultural diversity as key elements for development. It should include content that raises awareness of social, ethnic, linguistic and cultural realities, promoting inclusive learning that forms students with a broader and more respectful vision of the world, prepared to interact in multicultural environments.

Intercultural Competency Development

The text should facilitate the development of intercultural competencies among students. This implies the inclusion of content that promotes understanding, respect and appreciation of cultural differences, as well as the ability to interact effectively in intercultural contexts. In addition, it should foster critical thinking skills, allowing students to analyze and question stereotypes and prejudices, and learn to adapt to new perspectives. In this way, we contribute to the formation of individuals who are more empathetic and prepared to face the challenges of an increasingly diverse world.

Alignment with International Commitments

The text must be aligned with the international commitments established in the UNESCO Universal Declaration on Cultural Diversity (2006) and the International Convention on the Rights of the Child (n.d.). It should reflect the principles and values promoted by these declarations, such as respect for cultural diversity and the rights of children and youth. When reviewing the English textbook, it is important to assess whether it meets these indicators and whether it effectively contributes to the promotion of social inclusion, the recognition of cultural diversity and the development of intercultural competencies among students.

From UNESCO's principles on cultural diversity, we can identify the following indicators or guidelines to assess whether the English textbook meets international standards: These indicators include the equitable representation of diverse cultures, the use of inclusive and respectful language, and the inclusion of activities that encourage cultural exchange and critical reflection on global realities. It is essential that the text is not only an educational tool, but also a means to sensitize and prepare students to live in a multicultural world.

Inclusion, Respect, and Appreciation of all Cultures

The text should reflect the principle of inclusion, respect and appreciation of all cultures, promoting understanding and mutual respect. In addition, it should highlight

cultural diversity as an enriching value for society, offering students the opportunity to identify with different cultures and to actively participate in a globalized world.

Adaptation and Respect for the Cultural Identity of the Students

The text should be oriented to offer a quality education that respects and adapts to the cultural identity of the student body. It is essential that it recognizes the diversity of cultural experiences and provides content that not only reflects, but also respects the cultural identities of students. In this way, an inclusive learning environment is fostered where every student feels valued and represented

Imparting Cultural Knowledge, Attitudes, and Skills

The text should provide students with the knowledge, attitudes and skills necessary to participate actively in society, promoting intercultural understanding, empathy and the ability to relate effectively with people from different cultures. It should also encourage reflection on one's own identity and recognize the value of cultural diversity.

Fostering Respect, Understanding, and Solidarity

The text should equip students with the cultural knowledge, attitudes and skills that will enable them to foster respect, understanding and solidarity among individuals, ethnic, social, cultural and religious groups, as well as nations. It should promote intercultural dialogue and the building of relationships based on mutual respect and collaboration.

Finally, based on the principles of the Convention on the Rights of the Child, the following indicators or guidelines can be drawn to review whether the English textbook meets international guidelines: These indicators include the equitable representation of all cultures and groups, the inclusion of content that respects and promotes the rights of children, and the creation of a learning environment that values and protects the dignity and opinions of each student.

Reflection of Cultural Diversity

The text should reflect and promote respect for cultural diversity, including authentic and respectful representations of diverse cultures. In addition, it should offer students the opportunity to value traditions and customs of different groups, fostering harmonious coexistence and a global vision based on inclusion and empathy.

Promoting Respect and Tolerance

The text should promote respect and tolerance towards different cultures, highlighting cultural diversity as an essential value for an inclusive and just society. In addition, it should help students overcome prejudices and stereotypes, fostering collaboration and mutual understanding in order to form responsible citizens committed to peace and equity.

Integrated Child Development

The text should support the development of the whole child, promoting intercultural skills and competencies for peaceful coexistence in a multicultural world. In evaluating it, it is crucial to verify whether it contributes to the promotion of children's rights, especially the right to an education that respects cultural diversity and favors their development as individuals and members of society, encouraging them to be active agents in the construction of a more inclusive and just society.

Results

The results obtained in the study reveal a diverse and complex reality regarding the integration of intercultural elements in the English study materials used in basic education in Chile. While some of these texts show efforts to incorporate intercultural aspects, considerable variability is evident in their level of adherence to international guidelines in this area.

It has been observed that many of the materials lack adequate representation of cultural diversity, which limits students' ability to understand and appreciate the variety of cultural experiences and perspectives present in the world. This lack of representation can not only lead to a biased or incomplete view of reality, but can also contribute to the perpetuation of cultural stereotypes and prejudices.

In addition, a deficiency has been identified in the effective promotion of interculturalism in English study materials. Although interculturality involves the recognition and appreciation of cultural differences, as well as the ability to interact effectively with people from different cultural backgrounds, many texts lack activities or exercises specifically designed to foster this skill among students. This lack of focus on interculturality can limit the development of intercultural skills vital for active participation in a globalized and diverse world.

Table 1

Compliance with International Standards. Representation of Cultural Diversity

	Nivel de enseñanza							
Textos de estudio de inglés de Educación básica	**1° Básico**	**2° Básico**	**3° Básico**	**4° Básico**	**5° Básico**	**6° Básico**	**7° Básico**	**8° Básico**
Indicators								
Cultures represented in the text				●			●	●
Variety of names, surnames and physical characteristics of the characters	●	●	●	●			●	●
Inclusion of events historical, traditional or customs of different cultures			●					
Mention of different languages spoken by the characters.								

Source: Own elaboration

Table 2

Compliance with International Standards. Cultural Sensitivity

	Nivel de enseñanza

Textos de estudio de inglés de Educación básica	**1° Básico**	**2° Básico**	**3° Básico**	**4° Básico**	**5° Básico**	**6° Básico**	**7° Básico**	**8° Básico**
Indicadores								
Evitación de estereotipos culturales o raciales.								
Presentación de conflictos interculturales con sensibilidad y empatía								
Representación positiva de las contribuciones culturales de diferentes grupos étnicos								
Reconocimiento de la diversidad dentro de cada cultura				●			●	

Source: Own elaboration

Table 3

Compliance with International Standards. Relevant and meaningful content

	Nivel de enseñanza							
Textos de estudio de inglés de Educación básica	**1° Básico**	**2° Básico**	**3° Básico**	**4° Básico**	**5° Básico**	**6° Básico**	**7° Básico**	**8° Básico**
Indicadores								
Conexión del contenido con la vida cotidiana y las experiencias de los estudiantes	●	●	●	●	●		●	●
Inclusión de ejemplos y casos que reflejen la realidad cultural y social de los estudiantes								
Incorporación de textos literarios, poesía o cuentos tradicionales de diversas culturas.								
Relación del contenido con eventos o problemas actuales a nivel local o global		●					●	

Source: Own elaboration

Table 4

Compliance with International Standards. Promotion of Intercultural Dialogue

	Nivel de enseñanza							
Textos de estudio de inglés de Educación básica	**1° Básico**	**2° Básico**	**3° Básico**	**4° Básico**	**5° Básico**	**6° Básico**	**7° Básico**	**8° Básico**
Indicadores								
Ejercicios o actividades que fomenten la discusión sobre temas interculturales							●	
Inclusión de preguntas que inviten a los estudiantes a reflexionar sobre sus propios prejuicios y experiencias culturales								
Promoción del trabajo en grupos heterogéneos donde se fomente el intercambio de ideas y perspectivas								
Incorporación de proyectos o actividades que requieran la colaboración entre estudiantes de diferentes orígenes culturales								

Source: Own elaboration

Table 5

Alignment Compliance with International Regulations. Incorporation of Multimedia Resources

	Nivel de enseñanza							
Textos de estudio de inglés de Educación básica	**1° Básico**	**2° Básico**	**3° Básico**	**4° Básico**	**5° Básico**	**6° Básico**	**7° Básico**	**8° Básico**
Indicadores								
Uso de imágenes que representen la diversidad cultural de manera positiva y auténtica		●					●	
Videos o grabaciones de audio que muestran aspectos de la vida cotidiana en diferentes culturas								
Actividades interactivas en línea que permitan a los estudiantes explorar la							●	

cultura y la historia de diferentes grupos étnicos		
Enlaces a sitios web o recursos en línea que proporcionen información adicional sobre la diversidad cultural.	●	●

Source: Own elaboration

The representation of cultural diversity revealed a varied range of approaches in the texts analyzed. Some of these materials were able to appropriately reflect the richness and complexity of different cultures, offering an inclusive and respectful vision of diversity. However, other texts exhibited deficiencies in terms of the representation of different cultures, traditions and customs, suggesting a lack of sensitivity or awareness of the importance of addressing cultural diversity in a comprehensive manner in the educational context.

This finding underscores the urgent need to improve the inclusion of cultural diversity at all levels of basic education. By ensuring a more equitable and accurate representation of the diverse cultures present in society, mutual respect, empathy and understanding between different cultural groups can be fostered. In addition, an education that embraces cultural diversity in a meaningful way can contribute to building positive identities and strengthening the sense of belonging of all students, regardless of their cultural background.

The inclusion of cultural diversity in the school curriculum is not only an ethical and moral imperative, but also a necessity to prepare students to live in increasingly diverse and globalized societies. By recognizing and valuing the multiple cultural expressions present in the classroom, an enriching school environment can be cultivated in which diversity is celebrated as an asset for learning and personal growth. Ultimately, improving the representation of cultural diversity in educational materials can contribute significantly to building more inclusive, just and cohesive societies.

The results of cultural sensitivity highlight a significant problem in terms of the cultural sensitivity present in the texts analyzed. It became evident that many of these materials face difficulties in avoiding ingrained cultural stereotypes and negative representations of certain ethnic, cultural or social groups. This lack of sensitivity not only compromises educational quality, but can also have detrimental consequences by contributing to the perpetuation of prejudice and discrimination within the educational community and society at large. Improving cultural sensitivity in educational materials not only benefits students by promoting a more equitable and enriching education, but also contributes to building a society that is more just, inclusive and respectful of diversity.

The presence of cultural stereotypes in educational materials can significantly influence the perception and self-esteem of students belonging to marginalized or minority groups. Exposure to inaccurate or biased representations of their culture can lead to an internalization of negative stereotypes and a sense of exclusion or inferiority, which negatively affects their emotional well-being and academic performance.

It is imperative to address this problem urgently and systematically through a thorough review and significant improvement in cultural representation in educational materials. This involves not only eliminating harmful stereotypes, but also incorporating

authentic and diverse narratives and perspectives that reflect the complexity and richness of the different cultures present in society.

Relevant and meaningful content: Although most of the materials reviewed were able to establish a basic connection between the content and the cultural experiences of the students, a significant concern arose regarding the lack of inclusion of important historical events and cultural traditions in the materials. This omission can result in an impoverished and limited educational experience for students, as valuable opportunities to explore and understand cultural diversity in its historical and social context are lost.

Incorporating relevant historical events and cultural traditions into educational materials can significantly enrich students' cultural understanding. By contextualizing English language learning within a broader historical and cultural framework, students can develop a deeper and more nuanced understanding of English-speaking cultures and their influence on the contemporary world.

In addition, the inclusion of historical events and cultural traditions can contribute to building a positive cultural identity in students by providing them with a sense of connection and belonging to their cultural heritage. This is especially relevant in educational contexts where students come from diverse ethnic and cultural backgrounds, as it allows them to share and celebrate their own cultural experiences within the classroom.

Also, incorporating relevant and meaningful content can help foster greater student interest and engagement in English language learning. By relating language content to culturally relevant topics and events, students' intrinsic motivation to actively participate in the learning process and authentically explore English language and culture can be increased.

Promotion of intercultural dialogue: Detailed observation revealed a significant lack of active promotion of intercultural dialogue in the educational materials analyzed. Although some texts succeeded in making superficial connections between students' diverse cultures, traditions, and experiences, the lack of activities or exercises specifically designed to foster cultural exchange and mutual understanding was notable.

The absence of a clear focus on promoting intercultural dialogue can have profound consequences on students'understanding of cultural diversity. Without regular opportunities to engage in open and respectful discussions about culture-related issues, students may hold simplistic or stereotypical views of the relationships between different cultural groups. This not only limits their ability to appreciate and value diversity, but can also contribute to the perpetuation of prejudice and discrimination in the classroom and beyond.

To address this deficiency, it is crucial to incorporate active and participatory pedagogical strategies that promote intercultural dialogue. This may include activities such as thematic discussions, cross-cultural collaborative projects, cultural exchanges and visits to diverse local communities. By providing students with hands-on opportunities to interact with people from different cultures and share their perspectives and experiences, a deeper and more respectful understanding of cultural diversity can be fostered.

In addition, it is important that educators receive training and support to effectively implement these activities in the classroom. This may include developing intercultural dialogue facilitation skills, raising awareness of cultural diversity issues, and incorporating educational resources that promote inclusion and mutual respect.

Ultimately, by prioritizing the promotion of intercultural dialogue in educational materials and teaching practice, a more inclusive and enriching school environment can be created that prepares students to live and work in an increasingly diverse and globalized world.

Incorporation of multimedia resources: The detailed analysis revealed a missed opportunity in terms of incorporating multimedia resources to reflect cultural diversity in an authentic and positive way in the educational materials examined. Despite the availability and versatility of multimedia resources, many of the texts analyzed did not take full advantage of these tools to represent cultural diversity in a meaningful way.

The lack of authentic and positive representation of cultural diversity in images, videos and other multimedia tools can have a noticeable impact on students' learning experience. These multimedia resources have the potential to enrich educational content by providing concrete and visually striking examples of cultural diversity in action. However, their underutilization can limit students' ability to meaningfully connect with and develop a deep and respectful understanding of diverse cultural experiences.

Improving the inclusion of images, videos and other multimedia tools that authentically and positively represent cultural diversity can have significant benefits for education. These resources can help students visualize and understand abstract concepts related to cultural diversity by providing visual contexts that reinforce concepts taught in the classroom. In addition, exposure to a variety of cultural perspectives through multimedia can foster the development of cross-cultural skills and promote a greater sense of empathy and understanding of cultural differences.

Therefore, it is essential that educational developers and educators recognize the potential of multimedia resources to support inclusion and cultural diversity in the classroom. This may involve the careful selection of images and videos that represent a wide range of cultures and experiences, as well as the creation of multimedia content specifically designed to effectively address cross-cultural issues.

Improving the incorporation of multimedia resources in an authentic and positive way contributes to a more inclusive education that prepares students to function in a globalized world. This approach highlights the importance of revising and updating English textbooks in Chilean basic education, ensuring an adequate representation of cultural diversity. It also seeks to promote cultural sensitivity and foster intercultural dialogue in the classroom, key elements for facing the challenges of a diverse society.

Discussion and Conclusions

The evaluation of English study materials in primary education in Chile reveals a number of significant findings that demand immediate attention and action.

With regard to the representation of cultural diversity, the variability in the results underscores the urgent need for constant review and improvement of these educational resources. According to Regader (2024), Lev Vygotsky's Sociocultural Theory indicates

that individuals can adapt their environment according to their personal goals. This theory holds that the development of children in a specific cultural environment cannot be considered a universal standard and is not directly applicable to children from different cultures. An example of this is the case of a migrant student in a multicultural classroom, where the knowledge transmitted reflects the local culture, to which the student does not feel affiliated and lacks understanding; therefore, it is essential that textbooks are kept up to date and meet quality standards to ensure an effective and relevant education for students.

Adequate representation of the principles of intercultural education is essential to foster respect and understanding between different cultures. However, it is observed that only a few texts manage to adequately capture this cultural diversity. This finding highlights the need to improve the inclusion of different cultures at all levels of basic education.

On the other hand, although most of the texts represent a variety of character names, they omit their respective surnames. According to the article *TEl origen de los apellidos: el viaje a través de su historia* (Admin, 2023), his omission influences the identity and heritage of the characters, which could help students feel more identified and represented in educational materials. It is crucial to recognize that the surname has a meaning that varies significantly according to cultural, historical and personal context. In relation to physical characteristics, in the texts from first to fourth grade, a dark-skinned girl named Ruby is visualized, who interacts with the other characters. Respectfully.

However, the limited presence of historical events suggests an enrichment opportunity to broaden students' cultural understanding and contextualize English language learning.

In addition, the scarce information about the inclusion of traditions or customs from diverse cultures highlights a possible area for improvement. Incorporating this type of data can enrich students' cultural understanding and foster greater respect and appreciation for diversity. For example, in third grade alone, in the "*Story World*" lesson, students are invited to discuss in pairs a party in which children dress up for Halloween.

The section mentions that there is no reference to different languages spoken by the characters in any of the texts evaluated in the different grades. This omission is significant in the context of interculturality, since the inclusion of multiple languages would more accurately reflect the linguistic diversity present in society.

By representing the variety of languages spoken by the characters, educational materials could contribute to a deeper and more respectful understanding of different cultures and linguistic communities. In addition, this could promote appreciation of linguistic diversity and encourage the learning of additional languages, which is beneficial from both an educational and intercultural perspective. Therefore, the absence of this representation in the texts highlights an opportunity for improvement in the inclusion of linguistic diversity as an integral part of the intercultural approach to English language teaching.

In the context of cultural sensitivity, in terms of the avoidance of cultural or racial stereotypes, none of the texts analyzed met the alignment. This evidences a lack of sensitivity in the representation of different cultures and ethnic groups in English textbooks for basic education in Chile. The presence of cultural or racial stereotypes can contribute to perpetuating prejudice and discrimination, underscoring the urgency of reviewing and improving this aspect. According to Díez Gutiérrez and Rodríguez Fernández (2020), authors of the book "Educación para el Bien Común: Towards a critical, inclusive and socially engaged practice", the classroom is the context where students establish their social relationships, creating an environment where connections and

bonds are built. Collaboration in projects involves a dynamic in which aspirations, interests, motivations and needs converge, thus influencing the actions and decisions of the participants.

Similarly, in the presentation of intercultural conflicts with sensitivity and empathy, none of the texts analyzed achieved alignment on this indicator. Lack of sensitivity and empathy in the presentation of cross-cultural conflicts can limit students' understanding of cultural diversity and perpetuate simplistic or biased views of relationships between different cultural groups.

In terms of positive representation of cultural contributions from different ethnic groups, alignment was also not achieved. The lack of recognition and appreciation of the cultural contributions of different ethnic groups can contribute to their marginalization and invisibility in the educational context.

However, it is relevant to point out that only the fourth and seventh grade texts were able to meet the indicator of Recognition of diversity within each culture. This finding is evidenced by the question: *"Do you know someone from another country?"* (Do you know someone from another country?) and *"Do you have friends or family abroad?"* (Do you have friends or relatives abroad?) in the unit *"Where are you from?"* (Where are you from?), which interacts with the main countries that currently represent the majority of foreigners living in Chile, such as Peru, Colombia, Haiti and Venezuela.

However, this seems insufficient to exclude other units of equal importance, such as those related to meals or celebrations around the world, which are presented in English texts in other grades. This suggests that these textbooks could offer a more complete and nuanced representation of diversity within each culture, which would contribute to a deeper and more respectful understanding of cultural diversity among students.

Regarding relevant and meaningfulcontent, most of the textbooks meet the alignment in this indicator, with the exception of the sixth grade. This indicates that most of the educational materials analyzed manage to establish a connection between the content and the students' daily lives, addressing relevant aspects of their lives outside of school. This is reflected in activities that include visits to museums, trips to the park, trips and outings with the family. This integration of everyday experiences contributes to more meaningful and relevant learning.

In relation to the inclusion of examples and cases that reflect the cultural and social reality of the students, none of the books in the analysis meet the alignment in this indicator. The absence of examples and cases that reflect the cultural and social reality of students may limit the ability of educational materials to be relevant and meaningful to students, as well as to promote a deeper understanding of their environment.

According to the incorporation of literary texts, poetry or traditional stories from diverse cultures, once again, no book meets the alignment in this indicator. Failure to include literary texts, poetry, or traditional stories from diverse cultures may limit students' exposure to cultural and literary diversity, as well as different cultural perspectives and traditions.

Relation of the content to current events or problems at a local or global level, Only the second grade and seventh grade books comply with the alignment in this indicator. This suggests that these educational materials manage to establish a connection between the content and current events or problems at a local or global level. For example, they address the issue of climate in different parts of Chile, Caracas and Peru, presenting a unit focused on nature where the problem of endangered animals in Chile becomes evident.

However, by focusing only on extinctions in Chile, other currently recognized extinctions in places that might have cultural relevance for some students are excluded. Integrating these extinctions could help students understand the relevance and

importance of the content in its current context, thus promoting a more complete and contextualized understanding of global environmental issues.

In relation to intercultural promotion and dialogue, only the seventh grade book showed alignment with this indicator, specifically, in the unit *"Natural Disasters,"* this aspect was reflected in an activity that shows the geography of Peru and Ecuador, where students had the opportunity to listen to an audio related to the topic of natural disasters. This reveals a lack of focus on promoting intercultural dialogue through activities or exercises in most of the textbooks analyzed.

Regarding the inclusion of questions that invite students to reflect on their own cultural biases and experiences, none of the texts approached the guideline in this indicator. This lack of attention to self-reflection and cultural awareness in educational materials is notable.

Regarding the promotion of work in heterogeneous groups, where the exchange of ideas and perspectives is encouraged, no favorable responses were observed in relation to this indicator in the research. This suggests a lack of emphasis on promoting collaborative work and the sharing of cultural perspectives in textbooks.

Similarly, no positive responses were observed in relation to the incorporation of projects or activities that require collaboration between students from different cultural backgrounds. This indicates a missed opportunity to foster cross-cultural collaboration and teamwork in the classroom.

In relation to the use of images that represent cultural diversity in a positive and authentic way, it is observed that only the books of second grade and seventh grade addressed this aspect. This suggests that most textbooks are not adequately leveraging images to represent cultural diversity in an authentic and positive way, which is critical to promoting inclusive and respectful education.

No positive responses are mentioned in relation to the incorporation of videos or audio recordings showing aspects of daily life in different cultures. The lack of such resources can limit students' exposure to cultural diversity and restrict their understanding of the globalized world in which we live. Also, miss the opportunity to motivate students through images that remind them of their country of origin.

The absence of interactive online activities that allow students to explore the culture and history of different ethnic groups is also notable. Only the seventh grade book incorporated this type of interactive online activities. This suggests that most textbooks are not taking full advantage of the technological tools available to enrich students' learning experience and promote cross-cultural understanding.

Regarding links to websites or online resources that provide additional information on cultural diversity, it is observed that the seventh and eighth grade books included them. This inclusion is positive, as it allows students to access additional resources and broaden their understanding of cultural diversity.

In conclusion, this study highlights the importance of greater attention to intercultural education in English textbooks at the elementary school level in Chile. The results underscore the need to more effectively integrate cultural diversity and interculturality in these textbooks to comply with national and international guidelines and promote a more inclusive and equitable education, thus contributing to a more inclusive society.

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THE INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IN THE EDUCATIONAL ENVIRONMENT: TRANSFORMATIONS AND CHALLENGES

A integração das tecnologias de informação e comunicação (tic) no ambiente educacional: transformações e desafios

La integración de las tecnologías de la información y la comunicación (tic) en el entorno educativo: transformaciones y desafíos

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ABSTRACT

The integration of Information and Communication Technologies (ICT) in education transforms the transmission and acquisition of knowledge. The purpose of this study is to analyze how ICT makes learning more interactive, collaborative and personalized, adapting to the different styles and rhythms of students. The methodology includes a review of current practices and challenges related to the implementation of ICT in education. The results indicate that, despite rapid access to a large amount of information and overcoming the limitations of traditional classrooms, there are significant obstacles such as the lack of adequate infrastructure, the need for teacher training and resistance to change. It is concluded that it is essential to train teachers in both the technical use and pedagogical implementation of ICT, ensuring equal access to avoid the expansion of educational inequality. Furthermore, it is essential to maintain the balance between technology and educational content, aligning ICT with clear pedagogical objectives and managing issues of information security and student privacy.

Palavras chave:
tecnologias de informação e comunicação, ambiente educacional, aprendizagem interativa, segurança da informação

RESUMO

A integração das Tecnologias de Informação e Comunicação (TIC) na educação transforma a transmissão e aquisição de conhecimento. O propósito deste estudo é analisar como as TICs tornam a aprendizagem mais interativa, colaborativa e personalizada, adaptando-se aos diferentes estilos e ritmos dos alunos. A metodologia inclui uma revisão das práticas atuais e desafios relacionados à implementação das TICs na educação. Os resultados indicam que, apesar do acesso rápido a vastas informações e da superação das limitações das salas de aula tradicionais, há obstáculos significativos como a falta de infraestrutura adequada, a necessidade de formação docente e a resistência às mudanças. Conclui-se que é essencial capacitar os professores tanto no uso

técnico quanto na implementação pedagógica das TICs, garantindo igualdade de acesso para evitar a ampliação da desigualdade educacional. Além disso, é fundamental manter o equilíbrio entre tecnologia e conteúdo educacional, alinhando as TICs com objetivos pedagógicos claros e gerenciando questões de segurança da informação e privacidade dos alunos.

RESUMEN

Palabras clave:
tecnologías de la información y la comunicación, ambiente educativo, aprendizaje interactivo, seguridad de la información

La integración de las Tecnologías de la Información y Comunicación (TIC) en la educación transforma la transmisión y adquisición de conocimiento. El propósito de este estudio es analizar cómo las TIC hacen que el aprendizaje sea más interactivo, colaborativo y personalizado, adaptándose a los diferentes estilos y ritmos de los alumnos. La metodología incluye una revisión de las prácticas actuales y desafíos relacionados con la implementación de las TIC en la educación. Los resultados indican que, a pesar del acceso rápido a una gran cantidad de información y de superar las limitaciones de las aulas tradicionales, existen obstáculos significativos como la falta de infraestructura adecuada, la necesidad de formación docente y la resistencia al cambio. Se concluye que es esencial capacitar a los profesores tanto en el uso técnico como en la implementación pedagógica de las TIC, asegurando la igualdad de acceso para evitar la ampliación de la desigualdad educativa. Además, es fundamental mantener el equilibrio entre la tecnología y el contenido educativo, alineando las TIC con objetivos pedagógicos claros y gestionando cuestiones de seguridad de la información y privacidad de los alumnos.

Introduction

The integration of Information and Communication Technologies (ICT) into the educational environment has become increasingly frequent and necessary to keep up with today's social, economic and technological transformations. This article seeks to analyze how the use of these tools in the teaching and learning process can transform the way of teaching and the associated challenges.

ICT promotes significant transformations in the way knowledge is transmitted. Classes become more dynamic and interactive, facilitating students' active participation and stimulating their engagement with the content. In addition, the use of multimedia resources, such as videos, images and audio, enriches the teaching process, making it more attractive and facilitating students' understanding.

However, ICT integration also presents challenges to be faced. One of the most important is training educators to use these technologies effectively. It is essential that teachers master the tools available and use them in an appropriate pedagogical manner, designing activities that encourage student participation and learning.

Another significant challenge is the lack of adequate infrastructure in schools, such as computers, internet access and technological resources. Ensuring digital inclusion is essential in order to provide equal access to technologies, regardless of the students' socio-economic status.

Therefore, the aim of this article is to investigate how the integration of ICT in the educational environment transforms the teaching and learning process, identifying both the benefits and the challenges involved. The research will address the state of the art, elements of the theoretical framework and the structure of the article to provide a comprehensive overview of the effectiveness and obstacles in implementing ICT in schools.

Method

To investigate the integration of ICT in the educational environment, a literature review of primary and secondary studies was carried out, including meta-analyses, case studies and institutional research reports. We also carried out a qualitative analysis of interviews and questionnaires applied to teachers and students involved in ICT-mediated education. The literature review covered a period of three months and was carried out on various databases such as Scopus, Web of Science and ERIC. Relevant studies were selected that investigated different aspects of ICT integration in the educational environment, such as the use of mobile devices, online learning platforms and digital resources.

The primary studies included quantitative and qualitative research that assessed the impact of Information and Communication Technologies (ICT) on student learning, teachers' attitudes towards the use of ICT and the barriers to its effective integration. Secondary studies, such as meta-analyses, brought together the results of various studies to provide an overview of the state of the art in the field.

In addition to the literature review, interviews were conducted with teachers and questionnaires were administered to students involved in ICT-mediated education. This qualitative analysis provided insights into the participants' experiences and perceptions regarding the use of ICT in the classroom.

The results indicated that ICT has the potential to improve the quality of education by providing interactive and collaborative resources, facilitating access to information and promoting student autonomy. However, some challenges were identified, such as teachers' lack of technological skills, resistance to change and the lack of adequate infrastructure in educational institutions.

Based on the results obtained, recommendations were proposed to promote the effective integration of ICT in the educational environment. These recommendations include offering training and support to teachers, investing in technological infrastructure and promoting collaboration between the various actors involved, such as teachers, students and educational managers.

Theoretical Framework

The primary studies included quantitative and qualitative research that assessed the impact of Information and Communication Technologies (ICT) on student learning, teachers' attitudes towards the use of ICT and the barriers to its effective integration. In addition, secondary studies, such as meta-analyses, brought together the results of various studies to provide an overview of the state of the art in the field.

The literature review revealed that ICT has the potential to improve the quality of education by providing interactive and collaborative resources, facilitating access to information and promoting student autonomy. The literature also highlights that, despite these benefits, there are significant challenges, such as teachers' lack of technological skills, resistance to change and the lack of adequate infrastructure in educational institutions.

The qualitative analysis, which includes interviews with teachers and questionnaires applied to students involved in ICT-mediated education, offers insights into the participants' experiences and perceptions regarding the use of ICT in the classroom. These studies help to understand how ICT is implemented and what the main difficulties are.

Based on the findings of the research, important recommendations were identified to promote the effective integration of ICT in the educational environment. These recommendations suggest the need to provide ongoing training and support for teachers, invest in technological infrastructure and promote collaboration between teachers, students and educational managers.

Results

The integration of Information and Communication Technologies (ICT) into the educational environment has led to a series of significant transformations, as well as challenging education systems to adapt to a constantly evolving scenario. The results of this integration can be seen in various dimensions, such as the development of digital skills, the methodological evolution of teaching and digital inclusion, as well as in the way educators and students interact with each other and with the educational process.

Transformations brought about by ICT

- Dynamic teaching methods: ICT allows the use of interactive tools, educational games, simulations and multimedia resources that make learning more engaging and can cater to different learning styles.

- Access to Information: The use of the internet as a teaching resource opens doors to an almost unlimited amount of information, which democratizes access to knowledge and encourages autonomous research.
- Developing 21st Century Skills: There is a growing emphasis on skills such as critical thinking, problem solving, collaboration and communication. ICT offers platforms and tools that promote the development of these skills.
- Personalization of learning: Technologies such as learning management systems (LMS) and artificial intelligence (AI) help adapt the content and pace of learning to students' individual needs.
- Remote and Hybrid Learning: With the COVID-19 pandemic, ICT has become essential for maintaining the continuity of teaching through remote classes or hybrid models, combining physical and virtual presence.

Challenges faced

- Teacher training: Training teachers to use ICT effectively in the classroom is crucial and still represents a significant challenge. It is necessary to invest in ongoing training and technical support for educators.
- Infrastructure: The lack of adequate infrastructure in many educational institutions, such as high-speed connectivity and up-to-date equipment, can hinder the implementation of ICT.
- Digital Division: There is unequal access to technology between different social groups, regions and countries, which can widen educational disparities.
- Digital Security and Privacy: The protection of personal data and online security are growing concerns, especially with the intensive use of digital platforms for educational purposes.
- Changing Educational Culture: The introduction of ICT requires a cultural change that encompasses methodologies, assessment and even the traditional hierarchical relationship between teacher and student.

Conclusion of Results

The results obtained with the integration of ICT into the educational environment indicate an unprecedented transformation in the way education is conducted. When implemented well, ICT can enrich the educational experience and better prepare students for an increasingly digital world. However, in order to make the most of these benefits, it is essential to tackle the challenges related to training, infrastructure, access and educational culture. For the future, it is expected that pedagogical and technological innovations will continue, making learning even more inclusive, personalized and effective.

In addition, ICT offers more personalized learning opportunities, allowing students to progress at their own pace and access materials and activities tailored to their individual needs. This can contribute to greater academic success and student satisfaction.

Recent studies show that the use of mobile devices and educational applications has demonstrated significant improvements in student motivation and engagement. One example is the research conducted by Johnson et al. (2018), who found that the introduction of tablets in classrooms resulted in increased student interest and participation, culminating in advances in reading and writing skills. Another study by

Smith and Jones (2019) showed that the use of online learning platforms promoted collaboration between students, allowing them to work together on projects and activities, sharing ideas and feedback more easily, which resulted in a greater understanding of concepts and faster development of problem-solving skills.

It is important to note that although ICT has shown significant benefits in education, the results presented refer to only a few of the articles consulted, which indicates a limitation in the empirical evidence found. There is not enough comprehensive empirical evidence to support all the general conclusions about the effectiveness of ICT in education. In addition, the effectiveness of ICT also depends on proper planning, a solid technological infrastructure and the training of teachers, who are responsible for integrating these technologies efficiently into the teaching-learning process.

Discussion

Although the results are promising, the discussion reveals significant barriers to the full integration of ICT, including a lack of adequate infrastructure, insufficient teacher training and issues of equity and inclusion. In addition, resistance to change on the part of educational stakeholders and the rapid obsolescence of emerging technologies are challenges to be overcome.

However, it is important to emphasize that the validity of this discussion depends on the concrete evidence obtained from a robust literature review. Without a solid base of empirical results and reviewed literature, the discussion may not reflect the totality of the issues and challenges faced in ICT integration.

The research highlights the need for a robust educational policy that supports the incorporation of Information and Communication Technologies (ICT) in schools. Such a policy should not only ensure continued investment in equipment and advanced technological infrastructure, but also emphasize the training and professional development of educators.

The preparation of teachers is essential for the effective implementation of ICT, and this implies a long-term commitment to continuing education. Teachers need not only the technical skills to operate new tools, but also the pedagogical skills to integrate these technologies effectively into the curriculum. In addition, the assessment of ICT-mediated learning requires a new approach that takes into account the development of digital and 21st century skills.

Issues of equity and inclusion are also critical in the discussion about ICT in education. Unequal access to technology can exacerbate educational disparity, leaving students from rural and lower-income areas at a disadvantage. Efforts must therefore be directed towards ensuring that all students, regardless of their socio-economic background, have equal opportunities to learn and benefit from the technological tools available.

Resistance to change is another notable obstacle. Many members of the educational community, including managers, teachers and even parents, can be skeptical about the advantages of ICT, preferring traditional teaching methods. Changing this mindset requires an open and collaborative dialog, where stakeholders are involved in the decision-making process and can see the practical benefits of technology in education.

Finally, the rapid obsolescence of technologies presents a challenge in both financial and sustainability terms. Educators and those responsible for education policy should carefully plan how to invest in technologies that offer a longer lifespan or can be updated easily. Consideration for the life cycle of technological tools and the ability to

adapt are essential to avoid waste and ensure that investments have a lasting impact on student learning.

In short, while ICT has the potential to transform the educational environment, its effective implementation requires a holistic and strategic approach that overcomes technical, cultural and economic barriers. This involves the creation of inclusive policies, continuous support for educators' professional development, commitment to equity and constant updating to deal with the evolution of technology. However, for the discussion to be valid, it needs to be based on evidence obtained from a detailed and robust literature review.

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Integration of artificial intelligence in school education: impact on epistemology and ethical challenges

Integración de la inteligencia artificial en la educación escolar: impacto en la epistemología y desafíos éticos

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ABSTRACT

The integration of artificial intelligence (AI) in education aims to redefine educational processes through personalized learning and improved administrative efficiency. This technological advancement has the potential to optimize educational content according to the individual needs of students, thereby facilitating a more effective and student-centered educational experience. However, significant ethical concerns have also arisen regarding data privacy protection and the risk of algorithmic bias, which could compromise educational equity. To address these challenges, it is crucial to implement robust ethical policies that ensure a transparent and equitable use of AI in education, maximizing its potential to enhance learning outcomes.

Palabras clave:
personalización del aprendizaje 1, eficiencia administrativa 2, ética educativa, protección de datos, sesgo algorítmico 3, equidad educativa 4.

RESUMEN

La integración de la inteligencia artificial (IA) en la educación busca redefinir los procesos educativos mediante la personalización del aprendizaje y la mejora de la eficiencia administrativa. Este avance tecnológico tiene el potencial de optimizar el contenido educativo de acuerdo con las necesidades individuales de los estudiantes, facilitando así una experiencia educativa más efectiva y centrada en el estudiante. No obstante, también han surgido preocupaciones éticas significativas relacionadas con la protección de la privacidad de los datos y el riesgo de sesgo algorítmico, que podrían comprometer la equidad educativa. Para abordar estos desafíos, es crucial implementar políticas éticas robustas que garanticen un uso transparente y equitativo de la IA en la educación, maximizando su potencial para mejorar los resultados de aprendizaje.

Introduction

This research project analyzes how artificial intelligence (AI) is transforming education, impacting the epistemology of knowledge and the ethical implications of its use in educational institutions. It explores how AI changes the way students acquire, validate, and apply knowledge, as well as the benefits and ethical challenges, focusing on data privacy and algorithmic bias. The goal is to provide an in-depth understanding of these educational innovations and to propose best practices and policies for integrating AI into education in a responsible and equitable manner.

Theoretical conceptions frame this study at the intersection of technology and epistemology, examining how the methods and processes of knowledge acquisition are altered by AI. In addition, the ethical implications of their use in the educational context, where data privacy and algorithmic bias represent significant concerns, are considered. Applied ethics provides a framework for evaluating these aspects, highlighting the need for responsible and equitable practices in the development and implementation of AI in education.

The main objective of this paper is to provide an in-depth understanding of the effects of AI on school epistemology and to address the ethical challenges that emerge from its use. Through a review of existing literature, case studies, surveys and interviews, this project seeks to provide a comprehensive analysis that informs best practices and policies for AI integration in schools, thus ensuring quality and equitable education for all students.

Method

Data collection was conducted through a comprehensive review of existing literature, case studies on AI in the educational context. This approach allowed us to gain an in-depth understanding of the effects of AI on school epistemology, as well as to address the ethical challenges that emerge from its use. The review of previous studies will provide a comprehensive analysis of best practices and policies for integrating AI in schools, thus ensuring quality and equitable education for all students.

The analysis was conducted using a thematic analysis approach, identifying patterns and emerging themes that reflect the perceptions and experiences documented in the literature. This analysis will not only highlight the positive implications of AI, but will also address the ethical concerns surrounding its use, contributing to a framework for the responsible implementation of AI in education.

Results

Epistemology, a central branch of philosophy, is devoted to the critical study of the nature, origin, and limits of human knowledge Holmes, W., Bialik, M., & Fadel, C. (2019); Anderson & Dron (2011). At its core, epistemology explores how we know what we know and questions the bases on which knowledge is built. In the educational context, this discipline acquires a fundamental relevance by examining the methods and sources through which students acquire, validate and transmit knowledge OECD (2022).

Theories of knowledge, such as empiricism, rationalism, and constructivism, are crucial to understanding these epistemological processes in education Holmes, W.,

Bialik, M., & Fadel, C. (2019). Empiricism holds that knowledge is derived from sensory experience and direct observation, while rationalism argues that knowledge comes from reason and introspection. On the other hand, constructivism posits that knowledge is actively constructed by the individual through interaction with the environment and participation in meaningful learning activities Anderson & Dron (2011); Holmes, W., Bialik, M., & Fadel, C. (2019).

In contemporary education, epistemology not only examines how knowledge is acquired and validated, but also how emerging technologies, such as artificial intelligence (AI), are influencing these processes Williamson, (2020). The introduction of AI into the educational context is redefining pedagogical methods and transforming the structure of knowledge by providing new tools for learning personalization and large-scale educational data management Holmes, W., Bialik, M., & Fadel, C. (2019); Knox (2020).

This intersection between epistemology and technology underscores the importance of reflecting on how AI is changing not only the acquisition and validation of knowledge, but also the very foundations on which learning is based in modern educational institutions OECD (2022). Understanding these changes from an epistemological perspective not only allows us to explore the potential benefits of AI in education, but also to critically address the ethical and epistemological challenges emerging in this new digital educational landscape Luckin (2018); Knox (2020).

Empiricism holds that knowledge is derived from direct sensory experience and observation Dewey (2004). In an educational setting, this perspective implies that students learn best when they are actively engaged in hands-on observation and experimentation of real phenomena Holmes, W., Bialik, M., & Fadel, C. (2019). This methodology not only strengthens conceptual understanding through direct experience, but also fosters the development of critical analytical and observational skills.

On the other hand, rationalism argues that knowledge originates primarily through reason and logic Kahneman (2011). According to this theory, deep understanding and knowledge acquisition are achieved through critical thinking, reflection and logical deduction. In the educational context, this involves fostering reasoning and analytical skills among students, enabling them to critically evaluate and solve complex problems systematically Anderson & Dron (2011).

Constructivism, promoted by theorists such as Jean Piaget and Lev Vygotsky, proposes that knowledge is actively constructed by the individual through interaction with his or her environment and the internalization of new experiences OECD (2022). In education, constructivism emphasizes pedagogies that promote active and collaborative learning, where students engage in activities that allow them to explore, discuss, and construct meanings and understandings of their own Holmes, W., Bialik, M., & Fadel, C. (2019).

These fundamental epistemological perspectives not only inform how students acquire knowledge, but also provide a crucial theoretical framework for understanding how artificial intelligence and other emerging technologies are influencing and transforming these traditional educational processes (Williamson, 2020). Integrating these approaches with new technological tools can further enhance personalized and adaptive learning, while posing challenges to ensure that educational experiences are equitable and accessible to all students (Anderson & Dron, 2011; Knox, 2020).

With the introduction of artificial intelligence (AI) in education, these epistemological processes are being reevaluated and transformed. AI has the potential

to radically change how knowledge is acquired, validated and applied in schools. AI technologies, such as intelligent tutoring systems, adaptive learning algorithms, and data analytics tools, are reshaping traditional pedagogical methods Holmes, W., Bialik, M., & Fadel, C. (2019).

AI in education can personalize learning, adapting to the individual needs and styles of students (OECD, 2022). This not only facilitates a more personalized educational experience, but also allows for continuous validation of acquired knowledge through automated assessments and real-time feedback (Williamson, 2020). These tools not only optimize the learning process by dynamically adjusting to each learner's strengths and weaknesses, but also provide instant feedback that can improve understanding and application of knowledge efficiently and effectively (West, 2018).

The integration of AI in education is also redefining how knowledge and skills acquired by students are validated and applied. Traditionally, knowledge validation in education has relied heavily on human evaluation, which can be subject to bias and time constraints. With AI, automated assessment methods are introduced that can analyze large volumes of data quickly and objectively (Williamson, 2020).

This approach allows for more continuous and adaptive validation of student progress, providing instant feedback on areas of improvement and strengths. In addition, AI technologies can analyze learning patterns at the individual and group levels, which helps educators adjust their teaching methods and educational resources more accurately and effectively (OECD, 2022).

AI's ability to analyze data also facilitates a deeper understanding of how students learn and what pedagogical strategies are most effective in different educational contexts. This not only improves the effectiveness of the educational process, but can also inform the evolution of pedagogical theories and teaching practice in the future Holmes, W., Bialik, M., & Fadel, C. (2019).

AI in education is not only transforming traditional methods of knowledge acquisition and validation, but is also opening up new possibilities for improving the personalization and efficiency of learning. However, these advances also pose significant ethical and practical challenges that must be addressed with care and attention to ensure that the implementation of AI in schools is equitable, transparent, and beneficial to all students.

The integration of artificial intelligence (AI) in education is leading to a profound re-evaluation of the authority of knowledge. Historically, teachers and academic texts have been the main sources of knowledge and validation in schools. However, with the advent of AI, machines are beginning to play a more prominent role in knowledge provision and validation (Selwyn, 2019).

AI technologies, such as intelligent tutoring systems and adaptive learning algorithms, are providing students with direct access to vast repositories of information and skills. This unprecedented accessibility is not only democratizing access to knowledge, but also changing the power dynamics in the classroom. Students can now increasingly rely on AI technologies for personalized information, assistance, and feedback (Knox, 2020).

This change raises important questions about the traditional sources of authority and expertise in the educational context. Educators and AI designers must collaborate to ensure that AI technologies not only complement, but also enrich teachers' pedagogical skills and competencies. Maintaining a balance between technological innovation and the essential role of human learning in 21st century education is critical, Holmes, W., Bialik, M., & Fadel, C. (2019).

The use of artificial intelligence (AI) in education raises a number of important ethical issues that must be approached with caution. Among these concerns, one of the most prominent is the risk that algorithms will perpetuate existing biases or even generate new forms of discrimination (Noble, 2018). AI systems, by relying on historical data sets that may reflect social and cultural biases, have the potential to amplify and systematize injustices already entrenched in society.

Privacy of student data is another critical concern in the context of educational AI. AI technologies collect and analyze large volumes of students' personal and academic information, raising questions about how this data is managed, stored, and used Du Boulay, B. (2023). Improper exposure of this information could compromise the privacy and security of students, as well as their fundamental rights to confidentiality.

It is imperative that AI developers and educational policy makers implement robust ethical safeguards. This involves designing and using AI systems that are transparent in their operations, mitigate algorithmic biases, and effectively protect the privacy of student data Green, E., Singh, D., & Chia, R. (Eds.). (2022). It is also essential to establish clear regulations and effective oversight mechanisms to ensure that the use of AI in education is ethical and respectful of the rights of students and the educational community in general.

Educators and artificial intelligence (AI) developers assume a crucial ethical responsibility in the implementation of these technologies in the educational setting. It is critical that they ensure that the algorithms used are transparent, fair, and free of bias to ensure that automated decisions do not perpetuate or amplify existing injustices (Greener & Wakefield, 2015).

Careful and respectful management of student data is essential to protect their privacy and security Du Boulay, B. (2023). AI systems must be designed with adequate safeguards to minimize the risks of privacy breaches and ensure compliance with data protection regulations Green, E., Singh, D., & Chia, R. (Eds.). (2022).

Robust ethical frameworks are proposed that can guide the responsible integration of AI in schools. These frameworks should include clear principles for data collection, use, and protection, as well as guidelines for ongoing ethical and social impact assessment of AI technologies Holmes, W., Bialik, M., & Fadel, C. (2019); Campolo et al. (2017). It is crucial that these ethical frameworks are effectively implemented and monitored to ensure that AI is used in a way that benefits all students and promotes educational equity.

Artificial intelligence (AI) is defined as the ability of a machine to mimic human cognitive functions, such as learning, problem solving, and decision making (Russell & Norvig, 2016). In education, AI has become a powerful tool for transforming the way teaching and learning takes place. This conceptual framework addresses the main applications and concepts related to the use of AI in education.

In his work "Robot-Proof: Higher Education in the Age of Artificial Intelligence," Aoun (2017) provides a detailed conceptual framework on how artificial intelligence (AI) is influencing and transforming the higher education landscape. Aoun argues that AI is redefining the competencies needed for professional success in the 21st century, challenging the traditional conception of higher education focused solely on the acquisition of specific knowledge.

From a theoretical perspective, Aoun argues that educational institutions must adapt quickly to prepare students for an increasingly automated labor market. It proposes that higher education should focus on developing skills that are resistant to automation and can adapt to rapid technological advances. This approach not only

prepares students for today's jobs, but also equips them to meet the future challenges that automation and AI may pose

According to Eynon and Malmberg (2021), the concept of learning at the margins through the use of the Internet underscores the importance of considering how digital technologies are democratizing access to knowledge. This approach reinforces the need for educational policies and pedagogical strategies that promote digital inclusion and lifelong learning among historically excluded groups, thus transforming the traditional dynamics of access to knowledge in the digital era.

The introduction of artificial intelligence (AI) in education has opened up new possibilities for improving teaching and personalizing student learning. AI technologies, such as intelligent tutoring systems, adaptive learning algorithms, and data analytics tools, are redefining traditional pedagogical methods (Luckin et al., 2018). These tools allow adapting educational content and teaching strategies according to the individual needs of each student, offering more personalized and effective learning experiences (OECD, 2022).

AI not only facilitates the personalization of learning, but also transforms the way knowledge is validated and applied in the educational context. Automated assessments and real-time feedback provided by AI systems enable continuous validation of students' academic progress, thus improving the efficiency of the educational process (Williamson, 2020).

In addition to optimizing learning and teaching, the incorporation of AI in education is leading to a re-evaluation of the authority of knowledge. Traditionally, teachers and teaching materials have been the main sources of information and validation in schools. However, with AI, machines are taking on a more prominent role in knowledge provision and validation (Selwyn, 2019). This may alter power dynamics in the classroom, where students may begin to rely more on AI technologies for information and feedback, thus challenging traditional sources of authority in education (Knox, 2020).

Personalization of learning

One of the most significant applications of artificial intelligence (AI) in education is its ability to personalize learning accurately and effectively. AI systems are revolutionizing teaching by adapting the content and pace of learning according to the individual needs of each student. This is achieved through detailed analysis of student performance and behavioral data, allowing for the creation of personalized and dynamic learning profiles Holmes, W., Bialik, M., & Fadel, C. (2019).

These advanced technologies can identify specific areas of strength and weakness in each student's learning, which facilitates the delivery of targeted and appropriate educational resources to improve understanding and academic progress (OECD, 2022). By automatically adjusting content, exercises and pedagogical strategies, AI systems optimize study time and increase the effectiveness of the individualized learning process.

AI's ability to personalize learning not only enhances the student's educational experience, but also provides educators with powerful tools to support each student's holistic academic development. This adaptability allows educational systems to respond more accurately and efficiently to the diverse needs and learning styles present in the modern classroom, Agaoglu, M. (2016).

Analysis of Large Amounts of Data

The ability of artificial intelligence (AI) to process and analyze large volumes of data represents a crucial feature in the contemporary educational context. Advanced AI-powered data analytics tools have the ability to extract valuable information from

data generated from various educational activities, such as assessment results, class participation, and interactions on online learning platforms (Williamson, 2020).

These analytical systems enable educators and policy makers to gain deep and detailed insights into students' academic progress and behavior. The information obtained can be used to improve specific teaching methods, adapt curricula more effectively, and make informed educational policy decisions (Zawacki-Richter et al., 2019). In addition, AI facilitates continuous, data-driven evaluation that can identify areas for improvement at both the individual and institutional levels, thereby promoting the quality and efficiency of the education system as a whole.

Real-Time Feedback

Immediate feedback is crucial in the learning process, and artificial intelligence (AI) plays a key role in providing real-time feedback. Intelligent tutoring systems, for example, have the ability to assess students' performance instantaneously and offer accurate suggestions for improving their understanding and skills (Heffernan & Koedinger, 2012).

This type of feedback not only improves the efficiency of learning by tailoring it in a personalized way to the individual needs of each student, but also allows students to correct errors immediately and consolidate their knowledge more effectively (Greener & Wakefield, 2015). Moreover, by being provided in an automated manner by AI systems, this feedback can be constant and adaptive, which optimizes the teaching-learning process and contributes to more effective academic development.

Algorithmic Bias and Ethics

Despite the significant benefits it offers, the use of artificial intelligence (AI) in education also raises significant ethical and equity challenges. AI algorithms can perpetuate biases if they are not properly designed and monitored. For example, AI-based recommender systems may inadvertently favor certain groups of students over others, exacerbating pre-existing inequalities in educational access and quality (Noble, 2018).

The handling of students' personal data by AI technologies raises privacy issues that must be addressed with responsible policies and practices Du Boulay, B. (2023. It is essential to establish clear regulatory frameworks and effective oversight mechanisms to ensure that data collection, storage and use are conducted in an ethical and transparent manner, thereby protecting the fundamental rights of students and preserving trust in the education system.

Accountability and Transparency

Ethical responsibility in the design and implementation of artificial intelligence (AI) technologies in education is critical. AI developers and educators must collaborate closely to ensure that these technologies are transparent, fair, and equitable (Selwyn, 2019). Clear ethical frameworks and regulations should be established to guide the use of AI in the educational setting, thus protecting the rights and privacy of students while maximizing the educational potential of these technologies (Campolo et al., 2017).

It is essential to consider the broader ethical and social implications of AI in education. For example, the ethics of algorithms play a crucial role in educational equity, as AI systems can perpetuate existing biases if they are not carefully designed and implemented with adequate oversight (Noble, 2018). In addition, the privacy of student data must be rigorously protected to prevent breaches and ensure trust in the use of these technologies Du Boulay, B. (2023

Establishing an ongoing dialogue between AI developers, educators, policy makers, and the broader education community is crucial to address these ethical challenges and ensure that the implementation of AI in education is beneficial and equitable for all students (Luckin et al., 2018).

Graham's (2013) work on blended learning emerges as a fundamental resource for understanding the changing dynamics in contemporary education. In his study, Graham explores how the integration of face-to-face and virtual elements in blended learning has transformed traditional educational practices. He argues that this modality offers flexibility and personalization, making it possible to better adapt to the individual needs of students. This research is particularly relevant to contextualize the potential impact of artificial intelligence (AI) in education, as it suggests that advanced educational technologies can improve the accessibility and interactivity of learning.

The integration of artificial intelligence (AI) in education has been the subject of much research highlighting its ability to positively transform educational outcomes by personalizing learning and optimizing administrative processes (Luckin et al., 2018; Williamson, 2020). These technologies have proven to be effective in adapting educational content and teaching pace according to the individual needs of students, thus facilitating a more effective and student-centered educational experience.

However, along with these advances, important ethical concerns have also arisen that require rigorous and careful attention. In particular, protecting the privacy of student data has been identified as a critical priority as AI technologies collect and analyze large amounts of personal and academic information Du Boulay, B. (2023). This aspect raises serious implications about how this sensitive data is handled and protected to avoid privacy breaches and ensure the safety of students and their families.

The risk of algorithmic bias is another crucial aspect that could perpetuate and widen pre-existing inequalities in access and quality of education (Noble, 2018). Algorithms used in AI systems may introduce inadvertent biases that favor certain groups or disfavor others, thus compromising educational equity and fairness.

To address these ethical challenges, it is imperative that AI designers and educational policy makers work collaboratively and diligently. Measures need to be implemented to ensure that AI design and implementation are ethical, transparent and equitable (Floridi, 2014). This involves developing clear policies and safe practices that protect the rights of students and promote responsible use of technology in education.

Discussion

The introduction of AI is fundamentally redefining how students interact with knowledge in the educational environment. Intelligent tutoring systems and automated assessment tools are enabling more adaptive and personalized learning Holmes, W., Bialik, M., & Fadel, C. (2019). This adaptability is transforming the way knowledge is acquired and validated, as learners increasingly rely on machines for information and feedback (Anderson & Dron, 2011). This change could influence the traditional perception of knowledge authority, questioning who or what has the authority to validate information in an increasingly technological environment (Selwyn, 2019).

The immersion of AI in education is not only changing the way students access knowledge, but it is also impacting how they validate it. Traditionally, teachers and academic texts have been the main sources of authority in the knowledge validation process. However, with the increasing reliance on AI technologies for information and

feedback, students may begin to question and challenge these traditional sources of authority (Knox, 2020). This change may have profound implications for school epistemology, altering the power dynamics in the classroom and redefining how knowledge is perceived and valued in the modern educational context.

The transformation to a more AI-driven educational model raises important questions about knowledge authority and epistemological validation. Instead of relying exclusively on human interpretation and traditional teaching, students can now turn to automated systems for feedback and assessment. This transition could mean a significant change in the perception and legitimacy of knowledge, challenging the established norms of how information is acquired and validated in the contemporary educational environment (Floridi, 2014).

The implementation of AI in schools poses a number of significant ethical challenges. Privacy of student data is a primary concern as AI technologies collect and analyze large amounts of personal and academic information Du Boulay, B. (2023. Exposure of sensitive data could compromise the privacy of students and their families, highlighting the urgent need for clear policies and safe practices in educational data management (Floridi, 2014).

The algorithmic bias inherent in AI systems can perpetuate existing inequalities and generate new forms of discrimination, affecting equity and fairness in access to education (Noble, 2018). AI algorithms, by relying on historical data that may reflect social and cultural biases, have the potential to make automated decisions that favor certain groups over others, exacerbating disparities already present in the education system.

These ethical challenges underscore the critical need to develop robust regulatory and ethical frameworks to guide the responsible implementation of AI in schools. It is essential that educators, technology developers and policy makers work together to ensure that AI systems are transparent, equitable and fair. This involves not only protecting the privacy of student data, but also actively mitigating any algorithmic bias through careful design and monitoring of these technologies (Selwyn, 2019).

To mitigate these ethical risks, it is essential that both educators and AI developers take robust ethical responsibility. This involves ensuring transparency in the design and operation of algorithms used in educational AI technologies (West, 2018). Educators must be trained to understand and manage the ethical impacts of these tools on student learning and development (Williamson, 2020). Likewise, clear ethical frameworks are required to guide the responsible use of AI in education, ensuring that educational benefits are maximized while protecting the rights and dignity of all those involved Green, E., Singh, D., & Chia, R. (Eds.). (2022).

Research Limitations

Despite the important findings, this research has several limitations that must be considered when interpreting its results; although a comprehensive review of the academic literature has been conducted, the research relies heavily on theoretical studies and examples of AI implementation in various educational contexts. Because of this, some of the results obtained may not be directly applicable to all educational institutions, especially those with technological limitations or limited resources.

Most of the studies reviewed come from educational contexts in developed countries, where the technological infrastructure is more advanced. This may not adequately reflect the challenges and opportunities of implementing AI in low-resource settings or in regions where access to technology is limited.

Not all AI applications are uniform, and the effectiveness of AI tools depends largely on how they are designed, implemented and managed. The research does not address in depth the differences in the quality and scope of these applications, which could affect the generalizability of the results.

Conclusions

The use of artificial intelligence (AI) in education represents a potential revolution in school epistemology and educational practice in general. This technology promises to personalize learning, improve administrative efficiency and transform the way students acquire and validate knowledge. However, along with these benefits, significant ethical challenges arise that must be carefully considered and addressed.

The ability of AI to personalize learning to the individual needs of students offers significant potential for improving education. Intelligent tutoring systems and automated assessment tools can quickly adapt to each student's strengths and weaknesses, facilitating a more effective, student-centered learning process. In addition, AI can optimize the administrative management of educational institutions, helping to improve operational efficiency and the use of resources.

Despite its benefits, the implementation of AI in education poses a number of ethical and practical challenges. Privacy of student data is a critical concern as AI technologies collect and analyze large amounts of personal and academic information. Improper exposure of this data could compromise the privacy and security of students, as well as their fundamental rights.

Algorithmic bias is another major challenge that can perpetuate and widen existing inequalities, affecting equity in access to education. It is critical that AI designers and educators work to mitigate these biases and ensure that algorithmic decisions are fair and equitable for all students.

This research provides a solid foundation for understanding both the positive impacts and ethical challenges of AI in education. It is crucial to develop clear policies and ethical frameworks to guide the responsible implementation of AI in schools. These frameworks must include robust safeguards to protect the privacy of student data, as well as mechanisms to detect and correct algorithmic biases.

Artificial intelligence offers significant opportunities to personalize and improve education, but at the same time, it poses important ethical and practical challenges that must be carefully managed. This conceptual framework provides an in-depth understanding of the main concepts and applications of AI in education, laying the groundwork for future research and practice in this emerging field. It is imperative that educational decision makers consider both the potential benefits and risks of AI to maximize its positive impact while minimizing its potential adverse effects on students and society at large.

Continuity proposals

To address the above limitations and deepen the understanding of the impact of AI on education, we propose several lines of continuity for future studies such as; conducting large-scale empirical studies that assess the direct impact of AI technologies on student learning. These investigations should include the analysis of academic performance data, student and teacher perceptions, and the effectiveness of AI in different educational

contexts. Longitudinal studies would make it possible to evaluate how AI influences academic performance and long-term skill development.

It is necessary to extend studies to diverse geographical and socioeconomic contexts. Exploring how AI can be implemented in low-resource regions, and studying the barriers these institutions face, can contribute to a more complete picture of AI integration in global education. It is also suggested to evaluate the implications of the use of AI in educational systems with different policies and pedagogical approaches.

Although the reviewed studies address ethical issues, there is a need to move towards the creation of specific ethical and regulatory frameworks for AI in education. These frameworks should include clear guidelines on the responsible use of student data, transparency of algorithms, and constant monitoring to mitigate algorithmic bias. Collaboration between technologists, educators and ethicists will be critical to achieving AI implementation that respects the rights of students.

An underexplored area is how AI influences teachers' pedagogical methods. Future research should analyze how teachers adapt their practices in environments where AI plays a central role in the assessment and personalization of learning. In addition, research is needed to investigate how educators can maintain their pedagogical authority and their relationship with students in an increasingly automated context.

While AI can provide real-time academic feedback, there has been insufficient research on how these technologies influence the socioemotional aspects of learning. Future studies should consider how students perceive AI tools and their impact on their motivation, self-esteem and general well-being.

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The (In)Effectiveness of Educational Practices in Motivating 12th Grade Students in Biology Classes: The Case of Liceu do Xangongo, Angola

A(In)eficácia das práticas educativas na motivaçao dos alunos do 12º anon as aulas de biologia: o caso do liceu do Xangongo, Angolaçao

La (In)Eficacia de las Prácticas Educativas en la Motivación de los Alumnos de 12º Grado en las Clases de Biología: El Caso del Liceo de Xangongo, Angola

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ABSTRACT

The current study aimed to analyze the impact of teaching practices on student motivation in Biology classes at Liceu do Xangongo. This is a descriptive case study based on literature review, document analysis, as well as observation, interview, and questionnaire. The literature review revealed that motivation has been a subject of multidisciplinary interest, with significant contributions from psychology and pedagogy to educational practices. Two Biology classes were observed, one involving content exposition and another where students presented group work. In the observed classes, no adequate strategies were evident to reinforce student motivation to learn. For data triangulation, a questionnaire was administered to 40 students from the 12th grade of the Physical and Biological Sciences course, of which 80% claimed not to like the subject of Biology. Interviews were then conducted with the Biology teachers, one of whom is the coordinator of the subject. The data obtained from the observation in the 12th grade and the survey directed at the students and the interviews with the teachers and the pedagogical sub-director showed that the teaching practices at that school have been ineffective in motivating students to actively participate in classes. One of the causes of this ineffectiveness is the use of expository teaching methods in Biology classes and the lack of more sophisticated didactic resources.

Palavras-chave:
motivação, comportamentalismo, humanismo, teoria cognitivista, Aulas de Biologia.

RESUMO

O presente estudo tem como objetivo analisar a incidência das práticas docentes sobre a motivação dos alunos nas aulas de Biologia no Liceu do Xangongo. Trata-se de estudo de caso descritivo consubstanciado na revisão bibliográfica, análise documental bem como na observação, entrevista e questionário. A revisão bibliográfica permitiu constatar que a motivação tem sido tema de interesse multidisciplinar, com grandes

contribuições da psicologia e da pedagogia para as práticas educativas. Foram observadas duas aulas de Biologia, sendo uma de exposição de conteúdos e outra em que os alunos apresentavam trabalhos em grupo. Nas aulas observadas, não se evidenciou estratégias adequadas de reforço à motivação dos alunos para aprenderem. Para o cruzamento de dados, foi aplicado o questionário respondido por 40 alunos da 12ª classe do curso de Ciências Físicas e Biológicas, destes 80% alegou não gostar da disciplina de Biologia. Seguiu-se a aplicação das entrevistas às professoras da disciplina de Biologia, uma das quais coordenadora da disciplina. Os dados obtidos a partir da observação feita na 12ª classe e o inquérito dirigido aos alunos e a entrevista às professoras e ao subdiretor pedagógico permitiram constatar que as práticas docentes naquela escola têm sido pouco eficazes para motivar os alunos a participarem ativamente das aulas. Uma das causas dessa ineficácia identificada é a utilização de métodos de ensino expositivos nas aulas de Biologia e falta de recursos didáticos mais sofisticados.

RESUMEN

Palabras clave:
Motivación, conductismo, teoría cognitiva e clases de Biología.

El presente estudio tuvo como objetivo analizar la incidencia de las prácticas docentes sobre la motivación de los alumnos en las clases de Biología en el Liceo de Xangongo. Se trata de un estudio de caso descriptivo basado en la revisión bibliográfica, análisis documental, así como en la observación, entrevista y cuestionario. La revisión bibliográfica permitió constatar que la motivación ha sido un tema de interés multidisciplinario, con grandes contribuciones de la psicología y la pedagogía para las prácticas educativas. Se observaron dos clases de Biología, una de exposición de contenidos y otra en la que los alumnos presentaban trabajos en grupo. En las clases observadas, no se evidenciaron estrategias adecuadas para reforzar la motivación de los alumnos para aprender. Para el cruce de datos, se aplicó un cuestionario respondido por 40 alumnos de la 12ª clase del curso de Ciencias Físicas y Biológicas, de estos el 80% alegó no gustar de la asignatura de Biología. A continuación, se realizaron entrevistas a las profesoras de la asignatura de Biología, una de las cuales es coordinadora de la asignatura. Los datos obtenidos a partir de la observación realizada en la 12ª clase y la encuesta dirigida a los alumnos y las entrevistas a las profesoras y al subdirector pedagógico permitieron constatar que las prácticas docentes en esa escuela han sido poco efectivas para motivar a los alumnos a participar activamente en las clases. Una de las causas de esta ineficacia es la utilización de métodos de enseñanza expositivos en las clases de Biología y la falta de recursos didácticos más sofisticados.

Introduction

This article focuses on motivation as an important factor in student learning. Although the importance of motivation in the teaching-learning process is recognized, there are still educational practices whose teaching techniques and means have little impact on student motivation, and the results have been a lack of interest in studies, failure or even early school leaving.

The word motivation is present in everyday discourse, from informal to formal circles. We talk about motivation to achieve, motivation to overcome difficulties, motivation to succeed in almost every area, just as people need motivation to live. It's no coincidence that many people dedicate themselves to creating motivational content to encourage people who are facing difficulties or to inspire those who need light. What is motivation anyway?

Etymologically, the term motivation comes from the Latin "motivus", which means movement, and the suffix "tion", which indicates action, i.e. everything that drives human beings to act in one direction or another, with a view to achieving a certain end, a goal. Barajas et al. (2012) state that motivation refers to the causes that activate, guide and maintain human behavior for a certain period of time, once the subject identifies a goal as worthy of being achieved, and therefore makes an effort to do so.

Motivation is the set of psychological and physiological processes that lead an individual to act, that is, to trigger an action, to guide them towards certain goals (Mesquita &, Duarte, 1996, p. 145). It is the engine of action, capable of influencing behavior in any human activity, as well as establishing and maintaining emotional ties, social recognition and the individual's personal and social fulfillment.

The epistemological basis of motivation is based on psychological currents or theories, namely behaviorism, humanism and cognitivism. These theories seek to explain the process of motivation based on the principle that there is a need (motive) that triggers and guides human behavior (Eccheli, 2008).

Behaviorism focuses its study on observable conduct, neglecting any allusion to consciousness or any mental state. This psychological current is based on the idea that behavior is determined by environmental contingencies and motivation derives from the cues that provoke behavior and the reinforcements that maintain it. This current includes important research carried out by various scientists, including Thorndike and Skinner (cited in Baraja, et al., 2012). For example, in Skinner's theory, the most important factor in motivation is reinforcement or reward (Skinner, cited in Piletti, 2004).

Humanism emerged in the 1950s as a response to behaviorism, highlighting the vision of man as a unique and unrepeatable whole, with an intrinsically positive existential motivation that drives him to higher levels of achievement. In this current, human motivation is based on need, with an emphasis on conditioning mechanisms (Passanha et al., 2010).

Maslow, an advocate of humanistic psychology, carried out studies on self-actualization and established a hierarchy of human motivations. His theory includes two main concepts: basic needs (physiological and safety) and meta-needs (love, esteem and self-actualization). Maslow considered that man needs prestige, self-respect, justice and kindness as much as he needs food, sex and family stability. Human happiness results from the full satisfaction of basic needs and meta-needs (Maslow, cited in Mesquita & Duarte, 1996).

Unlike the previous ones, the cognitivist current assumes that each individual develops an interpretation of reality based on their own mental schemas and that the identification of goals and the disposition of personal resources of each individual cannot

be generalized to others, since each person develops different expectations of achievement and values goals differently (Barajas et al., 2012).

To illustrate, Rotter's (1954) cognitivist theory considers behavior to be the result of "the individual's needs and the expectation that this behavior will lead to their satisfaction" (cited in Mesquita & Duarte, 1996, p. 145). In this current, motivation is approached taking into account the individuality of man as a subject capable of identifying and knowing reality and projecting himself towards personal fulfillment. Thus, the individual seeks to set goals and understand their own behavior, and interprets phenomena arising from the environment according to mental schemas (Passanha et al., 2012).

Generally speaking, a person is motivated when they are predisposed and excited to carry out a certain action and persistently aim for a certain goal. It is because people are motivated that they engage in their activities, enjoy what they do, face challenges and overcome obstacles.

Vygotsky (1926), in his work Pedagogical Psychology, brought to light aspects inherent in motivation by emphasizing the impact of the student's interest in the educational process. For him, all teaching must be based on taking the exact interests of children into account and school activity must coincide with the needs of the pupil.

Thus, in the school context, motivation has direct implications for the quality of teaching, which is why its importance has gained prominence in educational research. Various studies have been carried out on this subject, including the following authors: Bueno (2002); Oliveira & Alves (2005); Fernandes (2009); Lourenço & Paiva (2010); Ribeiro (2011); Perassinoto et al. (2013); António (2014); Sabino (2023). Alongside these authors, we have selected some definitions, presented below.

From a pedagogical point of view, “motivation consists of offering students the incentives and stimuli that make learning more effective” (Piletti, 2004, p. 233). Based on this quote, it can be seen that the teacher must be skilled enough to make the right choice and offer what can really stimulate the student to learn effectively. Effective learning can be that which has some meaning for the learner and uses the knowledge learned in real-life situations. This requires the promotion of "frequent practice spaces (learning by doing) and environments rich in opportunities" (Bacich & Moran, 2017, p. 38).

From this perspective, the teacher must identify, select and apply strategies that encourage students to learn in a meaningful way. And this idea is corroborated by Ecchili (2008, p. 2) who says that "motivation in the classroom has to do with "the process of encouragement designed to predispose students to learning and to making efforts to achieve certain goals".

However, there are still teachers who think that motivating students is simply a matter of telling them anecdotes and jokes to make them laugh. This practice can be ineffective, as students may prefer the jokes to the content of the subject or prefer to spend the whole lesson laughing rather than developing cognitive skills which, in a way, are part of the teaching-learning process. And there are teachers who, because they can't get their students' attention or keep them quiet during the lesson, as if quietness were synonymous with learning, tend to start punishing their students.

In view of the above, Vygotsky (1926) calls attention to educators who try to motivate students by telling anecdotes, because, according to him, this attitude can arouse the student's interest in the anecdote itself and not in the subject of study. He also criticized teachers who use punishment or prizes to get the student's attention, because, as well as being detrimental to learning, it makes the student pretend to be attentive and strive to please the teacher, without actually understanding what is being taught.

Considering that school is a place of peace, tolerance and inclusion, punishment is unacceptable at school and should therefore be avoided.

Therefore, we rely on the contributions of the humanist current because it considers human needs to be a source of motivation, which is why the preparation of teaching activities must take into account the real needs of the students, try to understand the students' desires, cognitive conflicts and curiosities in relation to the contents of the subject to be taught.

Motivating is considered to be predisposing the student to learn the content easily, effectively and with satisfaction, in other words, to whet and maintain their "appetite" for knowledge. Motivation aims to arouse the student's attention to the subject to be learned and captivate their intellect in order to facilitate the acquisition, assimilation and construction of knowledge. Thus, motivating is not about telling jokes or performing comedy in the classroom (which some teachers do), but about getting students to recognize education as a vital necessity. Furthermore, it is important to innovate, to explore other resources that make the classroom an attractive space for students to learn meaningfully.

However, the teacher must be skilled enough to know the class he or she is working with in order to adopt strategies that motivate students not only to get high marks in exams, but also to be able to criticize, judge and rework knowledge. Lemos (1996 cited in Passanha et al., 2010) highlights the importance of fostering environments that encourage student initiative, getting them involved in decisions and not just waiting for everything to be said and decided by the teacher. It is believed that when students are open, they can be more engaged in the activities and can even accept new and different challenges, making the process of seeking new knowledge a meaningful activity.

In fact, respecting the students' curiosity and knowing how to listen to them is fundamental, since it frees the student and makes them more able to express their thoughts, bringing them closer to the object being taught, on the one hand; on the other, it facilitates the teacher's work and, moreover, favors participatory learning. And this is important because "listening to students' opinions and suggestions creates a sense of change and, consequently, motivation" (Antunes, 2018, p. 65). And it's important for the teacher to pay attention to the real needs of the students, which can be done through frank dialog and a dose of teacher sensitivity.

Sensitivity and open dialog can open up space for each student to express their ideas and opinions, allowing teachers to tailor their lesson plans to their students' needs, which is an important factor in motivating them to learn. According to Martins (2007 cited in Sabino, 2023, p. 13), "motivation is really fundamental to better student learning, as it creates the desire to achieve high performance".

In the opinion of Freire (1996, p. 33), "the construction or production of knowledge of the object implies the exercise of curiosity, its critical capacity about the object under study, to observe it, to delimit it or to make its methodical approach, its capacity to compare, to ask questions". In this sense, in the classroom it is important for the teacher to allow the student to express themselves, to ask questions and this can help to ensure that, depending on the content being taught, the teacher can motivate the student to learn consistently, rather than presenting them with ready-made content that has no relation to the cognitive needs of the subject of learning. It follows that the distance between what the student is curious about and the subject matter presented solely by the teacher can make educational practice ineffective in increasing student motivation and promoting effective learning.

The ineffectiveness of motivation in the teaching-learning process is a recurring obstacle in many classes (Sabino, 2023), especially in subjects where teachers find it

difficult to relate the content they teach to students' interests and needs. This can cause some students to devote little time to their studies, to be passive, uninterested or inattentive during class, and this, as well as making it difficult to understand, leads to apathy towards knowledge and school failure.

In fact, if the student doesn't want to learn, the teacher loses the opportunity to teach and his or her efforts are in vain, as they don't achieve the educational objectives. In order for students to study, they have to be motivated, which means reducing motivational blockages (limiting themselves to explaining everything, not relating the subject matter to the student's daily life), in order to adopt procedures by which it is possible to encourage the student not only to be in the classroom, but also to learn with satisfaction.

The subject of Biology is unique in that it is the object of study. On the one hand, it studies living organisms and natural systems, as well as the processes and laws that govern their development and stability. On the other hand, it studies the objects and phenomena that distinguish the levels of organization of living matter and their relationship with nature (António, 2010). For this reason, it is essential that the teacher adopts effective techniques and procedures so that students have the predisposition to grasp concepts, laws and principles and, at the same time, have the possibility of using this knowledge for their personal, professional and social fulfillment.

In the light of Law No. 17/16, of October 7, which governs the Angolan Education and Teaching System (Angola, 2016), the II Cycle of General Secondary Education is structured into three classes: 10th, 11th and 12th. In the case of the area of Physical and Biological Sciences, the subject of Biology includes the following thematic units: Plant and Animal Anatomy and Physiology, Genetics, Evolution and Systematics and topics related to the environment. In the same cycle of education, the content of Biology follows on from the knowledge students have acquired in previous classes, in the subjects of Environmental Studies, Nature Sciences (in Primary Education) and Biology (in the 1st Cycle of Secondary Education).

There are 18 general objectives for this cycle of education, among which the 13th objective stands out: "Developing group work, autonomy and a love of learning". (INADE, 2013, p. 6). In the second cycle of secondary education in Angola, the Physical and Biological Sciences course was conceived as the basis for higher education in engineering, medicine, biological sciences, higher nursing, etc. Biology is taught from 10th to 12th grade, alongside other subjects.

Based on the assumption that the subject of Biology is central to the Physical and Biological Sciences Course in the Second Cycle of General Secondary Education in Angola, it is thought that for students to learn it is necessary for the teacher to be creative in order to combine the available resources with teaching methods and procedures and thus create and/or recreate conditions that motivate the student to study, not only to pass the class, but also to acquire knowledge, develop skills and competencies based on socially useful and edifying values, attitudes and conduct. However, educational practice in our schools is different.

In this perspective, this study seeks to analyze the impact of educational practices on student motivation in Biology classes, carried out at the Xangongo High School located in the municipality of Ombadja in the province of Cunene in Angola. And the specific objectives: (i) to identify the factors that interfere with student motivation during Biology lessons; (ii) to describe the teaching resources available at the school to ensure Biology lessons; (iii) to verify the impact of educational practices on student motivation in Biology lessons at Liceu do Xangongo.

Method

Due to the complexity of the problem, we opted for a descriptive case study. According to Yin (2015, p. 244), this type of study aims to "describe a case in its real context". To this end, various procedures were used, as a way of engendering a more holistic view of the object of study, considering the multiple dimensions of motivation and learning. From a procedural point of view, the literature review, document analysis, observation, questionnaire and interview were useful.

Study participants

Grade 12 students and two Biology teachers from the Physical and Biological Sciences course at the school in question took part in the research. The students were mostly teenagers and young people, aged between 16 and 25, living in Xangongo, although there were some who came from the surrounding areas. The sample was made up intentionally of the 40 students enrolled in the 12th grade, a single class. In terms of gender, there were 17 males and 23 females, aged between 18 and 25.

The biology teachers were between 34 and 36 years old. The subject coordinator, the youngest, at the time had a degree in Biology Teaching and had been teaching for over 10 years. The other had completed her 4th year of higher education in the same subject, also with 10 years' experience. Alongside the two teachers, the institution's Deputy Pedagogical Director, a computer engineer, whose age he did not reveal, also took part in the study.

We opted for purposive sampling because this type of sampling made it possible to enrich the information for the theoretical foundation of the research, based on pragmatic and theoretical criteria about motivation (Aires, 2011).

Procedures

The literature review was used to approach the subject from the pioneering studies to the most recent ones, based on an analysis of the theories of various authors (Marconi & Lakatos, 2010) theories of various authors (Marconi & Lakatos, 2010). This method made it possible to identify a vast amount of literature on motivation and learning from the point of view of psychology and didactics. Alongside the literature review, the documentary analysis allowed us to analyze important documents in the education sector, such as the current educational legislation in Angola, the biology syllabus and the curriculum of the Physical and Biological Sciences course (Aires, 2011).

Direct observation, a procedure that allows the researcher to come into contact with the phenomenon being studied, was applied to the observation of two 12th grade Biology classes, in order to ascertain the motivational situation in Biology classes at the aforementioned school. Direct observation is useful because it reinforces the "source of evidence for conducting case study research" (Yin, 2015, p. 118).

A questionnaire is a data instrument consisting of a series of ordered questions" [...] (Marconi & Lakatos, 2010, p. 184). The questionnaire was given to the students of the 12th Physical and Biological Sciences class and to the Biology teachers at the same school, who answered the questions, allowing the data collected during the observation to be cross-referenced with the information provided by the teachers.

The interview is one of the "most important sources for the case study" (Yin, 2015, p. 114). For this research, short case interviews were used in three different sessions. First, the biology teacher was interviewed before the lessons were observed, followed by the Deputy Pedagogical Director of Liceu do Xangongo. The procedure made it possible to

obtain pragmatic information about motivation and its relationship with learning and its impact in biology classes.

Inductive method. The logic of this method consists of starting from particular cases to the general (Marconi, & Lakatos, 2010). Once the findings had been made in the field, the data collected was analyzed in the light of the theories on the subject, in a bottom-up connection that made it possible to identify the gap between practice and theory.

The data collected through the selected instruments was interpreted from a hermeneutic-interpretative perspective, based on the assumption that hermeneutics is an intellectual process that allows "capturing the form and meaning of human communication" (Carvalho, 2009, p.105).

The school is located in the village of Xangongo, the seat of the Ombadja municipality, in the Deolinda Rodrigues neighborhood, adjacent to the road that connects the municipal seat with the town of Calueque. It's a school with two floors, 24 classrooms, two offices, one for the principal and one for the assistant principal. It also has a teaching office, two general offices and a teachers' room. The school also has running water and electricity. There are private ones for teachers of both sexes, and private ones for students, respectively. It is a school whose imposing architecture and operation make it a benchmark in the municipality.

The school operates in three periods: morning, afternoon and evening. It has a vast team of professionals, from teachers to administrative staff. Teachers are trained in a variety of areas, from bachelors and graduates in educational sciences, such as Biology, Chemistry, Physics, Mathematics, Psychology, Philosophy, Portuguese Language, and non-educational courses, such as Law, Computer Science. Quantitatively, the school's human resources are shown in the table below. Table 1 summarizes the data on the number of teachers, administrative staff and guards at the school.

Table 1

Human Resources at Liceu do Xangongo

TEACHERS AND NON-TEACHING STAFF	FM	F	MINIMUM AGE	MAXIMUM AGE
Total number of teachers	37	10	26 years old	50 years
Total administrative staff	10	4	26 years old	55 years old
Other staff (guards)	1			32 years old

Note. Taken over from the Administrative Board of the Liceu do Xangongo.

As for the rooms available, the school has no functioning biology, chemistry or physics laboratories, only two computer labs equipped with computers and Internet access, as shown in Table 2. Alongside these rooms, a school library is available to the institution's students and teachers, as shown on the following page.

Table 2

Compartments available for research

TITLE	QUANTITY	DESCRIPTION
Library	1	Two reading rooms
Computer lab	2	Computers with internet access

Biology Laboratory
Physics and Chemistry

Note. Taken over from the Administrative Board of the Liceu do Xangongo.

Results

Two Biology classes were observed in the 12th grade at Xangongo High School, with the aim of finding out how and by what means the teacher motivates her students to learn Biology content.

In the 12th grade, there were the minimum conditions such as a blackboard, marker board and the necessary lighting to visualize surrounding objects, as well as the required ventilation.

It was a lesson on invertebrate animals. As a means of teaching, the teacher brought some animals into the classroom, such as porifera (river sponges), molluscs (snails and mussels) and arthropods (cockroaches).

In the beginning, the teacher paid little attention to motivational aspects, because instead of asking the students if they had any questions or curiosities to share, she began by summarizing the previous lesson. And surprisingly, the teacher tried to use joking words to make her students laugh, perhaps in order to cheer up the class.

As for the presentation of the content, the teacher was the only one to speak and didn't give the students a chance to ask questions, and even if they were interested in asking, there was little openness, especially in the first half of the lesson. In the same lesson, distortion of the content was also noted during the explanation. For example, the teacher went so far as to say that "animals are autotrophic beings, which produce their own food", but forgot that this is the characteristic of some types of bacteria, all algae and plants.

There are two possible causes for this: on the one hand, the teacher's negligence could be at the root of this misconception, i.e. the fact that she has been teaching for over a decade may have meant that she didn't plan the lesson properly. On the other hand, the presence of an observer might have hindered her thinking and blocked her memory at the time, even though she had been informed about the visit in advance.

Another aspect to emphasize is that the teacher encouraged her students to study for the test and not to gain knowledge, and she even said: "You have to pay attention to what I'm saying, because it's going to be on the test, and anyone who doesn't answer well will fail."

It's clear from the above that students only have to learn what they're taught in order to be able to answer the tests, otherwise they run the risk of failing. In fact, this doesn't motivate students to deepen their knowledge or expand their horizons, but rather to study in order to pass. Considering the test as an instrument for assessing learning, it is advisable that it (the test) "helps to motivate students to learn with understanding and to give them an account of their progress and successes, but also of their failures and difficulties" (Fernandes, 2008, p. 93). Therefore, asking students to study to pass makes them limited and blocks their intellect. That's why there are so many graduates, but no skills.

As with the first lesson, we also observed another lesson with a different format. They were no longer simple lectures. In this class, the students presented their work in groups in front of their classmates and it was evaluated by the class. This lesson was useful if we consider that motivation can be triggered by diversifying the strategies used by teachers.

In this class, the students seemed withdrawn and unmotivated. As final-year students, it was expected that they would be more participative as this was a class in which they would be presenting work they had supposedly done themselves, and would have the opportunity to demonstrate the skills they had acquired over the three years. But the opposite was happening.

For example, one of the students was talking about reproduction in animals and couldn't explain external fertilization. In order to clear up the doubt, the teacher gave an example of the fertilization of tomato plants (*Lycopersicum esculentum*) as a type of external fertilization. You forgot that the question was about external fertilization in animals, not plants.

Now, while the teacher was presenting the incorrect answers, the students were restless, unconvinced, and some were whispering among themselves, perhaps because they had noticed the teacher's slip, realized the confusion. In this class, the psychodynamic aspects were absent.

However, direct observation has its limitations, as the individual being observed may simulate behavior or feel it difficult to behave naturally, which can distort the interpretation of the data (Marconi & Lakatos, 2010).

In order to cross-check the data, a questionnaire was administered to students in the 12th grade of the Physical and Biological Sciences course at the institution in question. The questionnaire addressed to Grade 12 students aimed to assess whether the students were motivated in Biology classes. The 12th grade was chosen for the survey, as they are the school's final-year students and best represent the profile of the biology teaching-learning process inherent in that educational institution.

The 40 students in the 12th grade took part in the student questionnaire. The first question aimed to find out which of the subjects in the Physical and Biological Sciences course was the students' favorite. For this question, only 8 students, corresponding to 20%, claimed to like Biology, and 32 students, 80%, prefer other subjects in grade 12.

These data corroborate the results of the studies carried out by Ndatemapo (2014), in his end-of-course work, in a sample of 32 students from the 1st Cycle, only 7 students, that is, 22% of the students said they liked the subject of Biology. In the same year, António, in a sample of 36 primary school students, only 17% of the students surveyed thought they liked this subject.

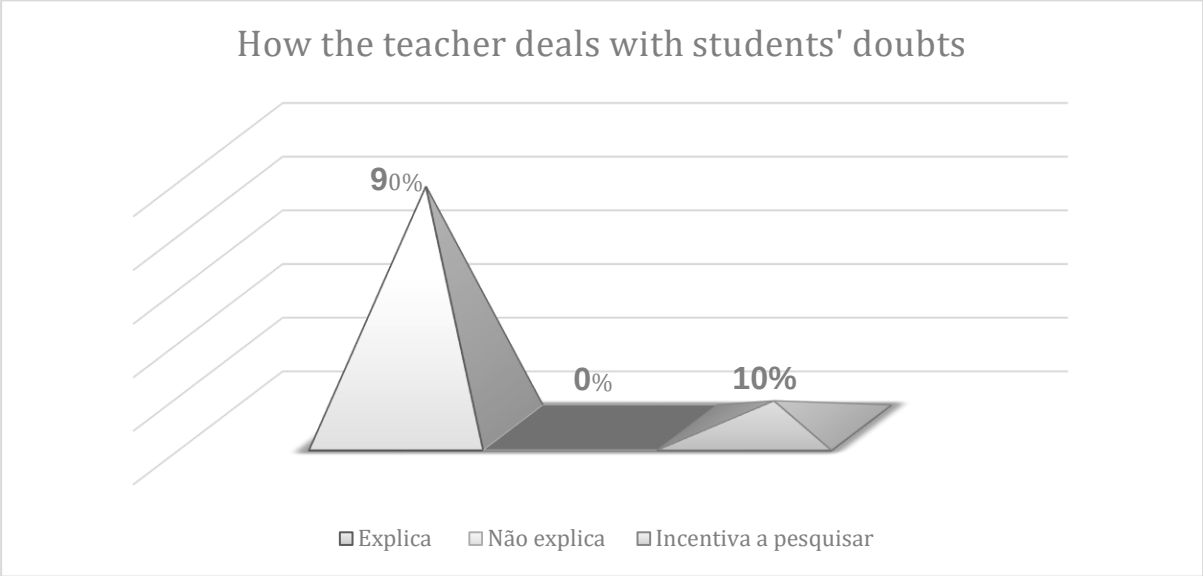
Question 2 asked whether students felt motivated in Biology classes, and 40 students answered that they felt motivated in Biology classes, which corresponds to 100% of the students surveyed. However, this data contrasts with the answer to the first question, as the students claimed not to like the subject of Biology, but said they felt motivated in Biology classes.

This was followed by another question aimed at checking how the teacher motivates the students, so 90% of the students (36 students) considered that they were motivated when the teacher talked about the importance of the subject, and 4 students, or 10%, felt motivated by anecdotes. This response corroborates the initial idea, which was that the students' motivation in the classroom did not consist of telling jokes or making jokes during the lesson, but of convincing the students of the importance and usefulness of the content and the subject in everyday life.

Based on the idea that the student should be the active subject of learning and that the teacher should encourage research, we asked how the teacher deals with the students' doubts, as shown in graph 1. 36 students said that the teacher explains, and 4 students said that the teacher encourages research.

Graph 1

How the teacher deals with students' doubts during biology lessons

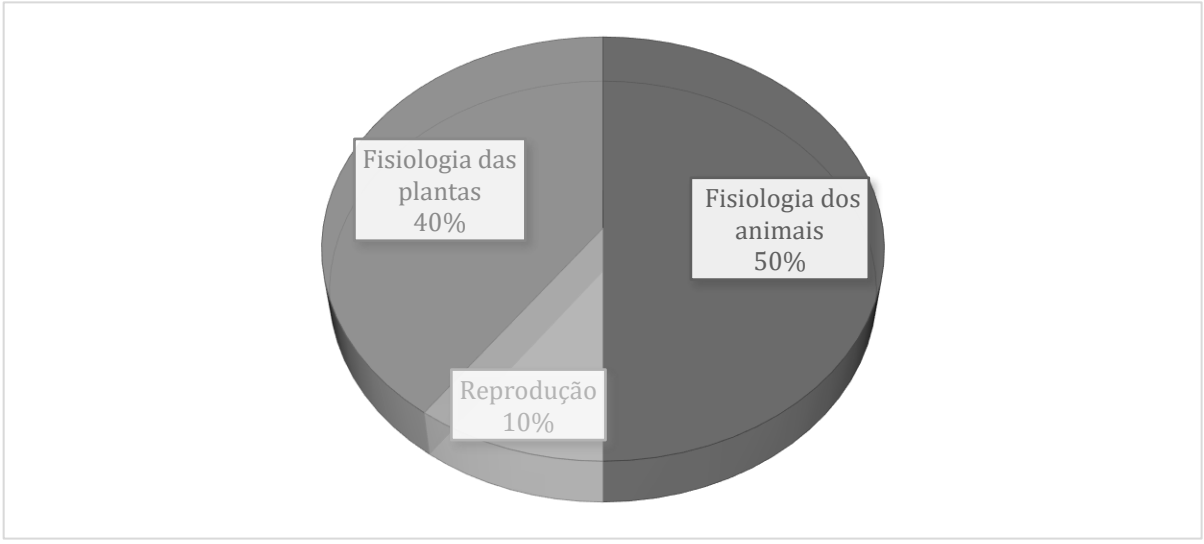


Graph 1 shows that students are hardly encouraged to do research, but are instead offered ready-made truths, which makes the lesson one-sided and the student passive. In Piaget's (1998) view, hollow verbalism, as the main educational tool, hinders the student's understanding.

The students were also asked which subject they most enjoyed learning in Biology, from 10th to 12th grade, and they showed a preference for the subjects in the last grade. The results of this question are summarized in Graph 2. This question was important because it aimed to understand the impact of teaching practices on students' learning throughout the training process.

Graph 2

Topics that students most enjoyed learning about in Biology lessons



Graph 2 shows that the students liked the 12th grade subjects exclusively, with the highest percentage (50%) for the II and III Quarter subjects "Animal Physiology", while for "Plant Physiology", the I Quarter subject, the percentage was 40%.

In order to ascertain the students' level of understanding of the themes, they were asked to justify why they liked the selected theme. One of the students said he enjoyed studying "Plant Physiology" because "In hormonal coordination I like to know what glands a being has and where we come from". Another student explained: "Because he tells us about everything and how it happens during his phase."

Although the students said they liked the topics in grade 12 better, they had difficulty justifying it, which shows the inadequacy of the teaching methods used in biology classes at that school. This shows that the explanatory errors observed during biology lessons have some impact on the understanding of the content.

Therefore, the analysis of the answers given by the 12th graders raised the following questions: What is the teacher's opinion of the students' motivation?

First, the teacher whose class was the first to be observed was interviewed. The first question was: What do you think about motivation in the teaching-learning process?

In response, the teacher highlighted several aspects, culminating in what she considers to be motivation: "motivation is a construct that refers to the momentary directing of thought, attention and action towards a goal". It's clear from the answer that the teacher has some information about motivation.

The teacher was then asked if her students felt motivated during the lesson, and the answer was "yes" and then "sometimes". The justification for this answer was that students aren't always motivated and it doesn't just depend on the teacher.

To the question of how the teacher has motivated her students, she responded by emphasizing the importance of the topic during the lesson. However, this response is at odds with what was observed in the 12th grade class, because during the observation we didn't see any concern to explain the relevance of the topic in order to motivate the students. This revealed a contradiction between what happens in educational practice and what the teacher thinks about motivation. This question aimed to identify the factors that interfere with students' motivation. The teacher spoke up: "When you don't achieve the objective of the lesson, the social and economic conditions". And on the factors that contribute to student motivation, the answer was as follows: "when the teacher achieves the goal of the lesson for the student".

From this response, it can be understood that ignorance of the factors that strengthen motivation may be the reason for not applying strategies or actions that contribute to motivating students.

They were also asked what other factors influence student motivation. The teacher highlighted the subject's curriculum as a factor and the explanation was: "Because the Biology Curriculum must respond to the needs and interests of the educational scene in order to meet the expectations of the government (the quality of teaching)."

The previous questions were also asked of the second teacher interviewed, who was observed to be the subject coordinator at the time. For her, motivation is "a set of motives that manifest and influence an individual's behavior", and she considered the factors that demotivate students to be "social and economic conditions and lack of interest". As for the factors that contribute to student motivation, she highlighted "good performance, greater interest in the subject".

Coincidentally, he also emphasized that the biology curriculum should be adaptable to the reality of the educational setting and respond to the needs and interests of each student. He explained that this would be in line with the government's expectations in the field of training for staff in the discipline of Biology.

In order to gather relevant data on the concept and the factors that contribute to or interfere with motivation, the interviewee said that motivation has to do with "the teachers' sense of direction, the teachers' teaching materials and availability, and the classroom conditions to arouse the students' desire to acquire the knowledge of a subject".

With regard to the factors that contribute to student motivation, the Deputy Pedagogical Director considered it important to improve infrastructure, adopt teaching resources and train teachers to teach easily.

Regarding the adequacy of the programs to meet the needs and interests of the student, the interviewee replied: "reviewing the programs, which involves reviewing and evaluating them and adjusting them to the needs of the present time. This requires a sense of responsibility and more commitment on the part of everyone involved in the teaching-education process."

The idea of reviewing the curriculum and adjusting it to local needs has been advocated by several authors. In order to provide quality teaching and prevent the erosion of the education system, it is essential to reduce bureaucracy in curricula (Carvalho et al., 2006). Fagundes et al. (1999), for example, suggest adopting a curriculum for each student, i.e. individualized curricula, because students are not the same and each student has their own learning style. The above idea is supported by Bacich & Moran (2018, p. 45) in their approach to "personalized learning based on the student's life project".

Discussion and conclusions

The observations showed that the teachers are aware of the concept of motivation, but find it difficult to operationalize lessons in which it would be possible to apply strategies or procedures that would really motivate the students in Biology lessons, and this was seen in the use of jokes or jocular scenes to make the students laugh, as if this were a guarantee of motivation to learn the contents of the Biology subject.

As this paper argues, motivating is not about comedy. It's about connecting the psychodynamic aspects of the students with the content being taught, it's about engaging the students to take an active part in the lesson and, above all, it's about provoking their intelligence to learn in a meaningful way. Students should not learn content without knowing why and what to learn it for.

In the interview, the lack of adequate teaching resources, the correct selection of teaching methods and the affective relationship between teacher and student were not mentioned by the teachers surveyed. This situation is worrying, given that solving a problem requires identifying and knowing its cause. In other words, in order to motivate students, it is essential to know the factors that hinder motivation and every motivational strategy must be based on these factors.

According to the survey, there is a need to motivate students, because only 20% of them like biology and if they don't like it, they hardly feel motivated to learn. After all, why do 80% of students dislike the subject of Biology?

It is assumed that students dislike the subject of biology because they have little opportunity to question, doubt and debate the content. As they are limited to taking notes and remaining passive in class, they don't cultivate a taste for the subject. In our opinion,

students should have more opportunity to ask questions, reflect and look for solutions, and the teacher should stimulate and guide the class. Because learning is directed at the student, it is the student who learns. The student must be the protagonist of their learning.

Learning should encourage changes in behavior, attitude and enrich problem-solving skills, i.e. students should not only acquire knowledge, but also change their behavior, and more than learning, it is important that learning has relevance for the learner. When learning, there must be a difference between the moment before and the moment after, so the student must be able to face new challenges, solve concrete problems and, in a substantive way, enrich their experience. However, this difference must be qualitative, because it's not important to clutter the student's memory with vain information, without it having any meaning for them, and the accumulation of knowledge is useless if the individual doesn't change their behavior and attitude.

The arguments presented from the first chapter to the discussion of the results have led to conclusions from both a theoretical and practical point of view. Thus, the review and analysis of the literature on motivation in the school environment suggests that it is a determining factor in the quality of the teaching-learning process, since sufficiently motivated students actively participate in class.

In conclusion, both the observation of the classes and the data collected from the interviews with the teachers and the deputy head teacher, as well as the questionnaire to the students, indicate that the poor motivation of the students in Biology classes is the result of the following factors: (i) the exclusive use of expository methods, which results in passive learning; (ii) the lack of initiative on the part of teachers to adopt appropriate strategies to arouse students' interest and curiosity during Biology lessons; (iii) the lack of a laboratory for this subject in order to guarantee the relationship between theory and practice and encourage the active participation of students in the construction of knowledge, developing in them a spirit of research; and (iv) the difficulty of enriching teaching activities with activities that give students more of a leading role, in which each student has the opportunity to express their thoughts, disagree and express curiosity about the content they are being asked to learn.

Nowadays, it is important for schools to look for innovative aspects in the teaching-learning process, in the sense that teachers can incorporate pedagogical strategies that favor student protagonism and promote active learning (Camargo & Daros, 2018).

Since the inefficiency of motivation is a barrier present in Biology classes, we suggest that further studies be carried out on the subject in other educational institutions to identify the factors that interfere with motivation. Also investigate the influence of the teacher's motivation as one of the actors in the teaching-learning process, in order to gain a deeper insight into the case and provide a meaningful intervention.

For this intervention to be effective and efficient, it is important:

- Consider carrying out a longitudinal study to follow the evolution of student motivation over time, allowing for a more comprehensive analysis and the identification of possible changes or trends.

- Providing opportunities for students themselves to actively participate in the process of improving educational practices, encouraging dialog and collaboration between students and teachers.

- Find volunteer teams (made up of psychologists, pedagogues, psychopedagogues and others) who can help in the process of improving the school.

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