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ARTIGO

PROBLEM-BASED LEARNING: AN EXPERIENCE IN SECONDARY SCHOOL
APRENDIZAGEM BASEADA EM PROBLEMAS: UMA EXPERIÊNCIA NO ENSINO FUNDAMENTAL

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ABSTRACT[3]**:** Problem-Based Learning (PBL) is a teaching and learning method that seeks to develop conceptual, procedural and attitudinal content through collaborative work. The method can be applied in different knowledge areas, and there is a prevalence of its application in Higher Education, with scarce research applied to Primary and Secondary Education. Regarding the role of the teacher, some authors defend the teacher as an important mediator in learning, while others confer a supporting role. PBL contributes to the development of critical and reflective thinking, promoting meaningful learning. Presented is the result of a collaborative qualitative research project. The objective of which was to identify changes in the teaching and learning relationship using PBL at a public secondary school in the countryside of São Paulo through the subject of History. Overall, the results show that PBL allows the teacher to get closer to the students, enhancing learning.

Keywords: Problem-Based Learning, secondary school, teacher training, active methodology, teaching and learning process.

APRENDIZAGEM BASEADA EM PROBLEMAS: UMA EXPERIÊNCIA NO ENSINO FUNDAMENTAL

RESUMO: A Aprendizagem Baseada em Problemas (ABP) é um método de ensino e aprendizagem que busca o desenvolvimento de conteúdos conceituais, procedimentais e atitudinais por meio de trabalhos colaborativos. O método pode ser aplicado em diferentes áreas do saber, e há prevalência de sua aplicação no Ensino Superior, com escassas pesquisas aplicadas ao Ensino Fundamental. Sobre o papel do professor, alguns autores defendem o docente como mediador importante na aprendizagem e outros lhe conferem um papel de coadjuvante. A ABP contribui para o desenvolvimento do pensamento crítico e reflexivo, promovendo uma aprendizagem significativa. Apresenta-se uma pesquisa qualitativa do tipo colaborativa, com o objetivo de identificar as mudanças na relação ensino e aprendizagem com a aplicação

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da ABP na disciplina de História do Ensino Fundamental de uma escola pública do interior de São Paulo. Os resultados mostraram que a ABP permite maior aproximação do professor com os alunos, potencializando a aprendizagem.

Palavras-chave: Aprendizagem Baseada em Problemas, ensino fundamental, formação de professor, metodologia ativa, processo de ensino e aprendizagem.

APRENDIZAJE BASADO EN PROBLEMAS: UNA EXPERIENCIA EN EDUCACIÓN PRIMARIA

RESÚMEN: El Aprendizaje Basado en Problemas (ABP) es un método de enseñanza y aprendizaje que busca el desarrollo de contenidos conceptuales, de procedimiento y de actitud con trabajos de colaboración. La revisión de la literatura identificó que el método se puede aplicar en diferentes áreas de conocimiento y existe una prevalencia de su aplicación en la educación superior, con poca investigación aplicada a la educación primaria. Sobre el papel del maestro, algunos autores defienden como un mediador importante en el aprendizaje, y otros como un papel de apoyo. El ABP contribuya al desarrollo del pensamiento crítico y reflexivo, promoviendo un aprendizaje significativo. Se presenta una investigación colaborativa cualitativa, con el objetivo de identificar cambios en la relación de enseñanza y aprendizaje con la aplicación de ABP en la disciplina de Historia de una escuela primaria de una escuela pública en el interior de São Paulo. Los resultados mostraron que ABP le permite al maestro acercarse a los estudiantes, mejorando el aprendizaje.

Palabras clave: Aprendizaje Basado en Problemas, enseñanza primaria, formación del maestros, metodología activa, proceso de enseñanza y aprendizaje.

INTRODUCTION

Problem-Based Learning (PBL) is a teaching and learning method created at *McMaster* School of Medicine in Hamilton, Ontario, Canada in 1965. The objective was to expand the knowledge and development of medical skills of students in collective, cooperative, and collaborative work, starting from hypothetical problem situations and close to what future doctors would encounter in their professional lives.

McMaster educators understood that their classes were failing to be effective in training their students, given that the content was largely overlooked, and, therefore, did not ensure learning. Amid questions, criticism, and planning, the first class of students, comprised of 19 members, started using the method in 1969 (SAVIN-BADEN; MAJOR, 2004).

Other countries, including Brazil, started to use PBL, mostly in Higher Education and also in courses unrelated to medical areas. Some American teachers tried PBL in elementary school, but no research was found on the use of the method in Brazil at this educational stage, as confirmed by the literature review presented below. Publications concerning the application of PBL in higher education indicate that the method enables greater interaction between students in group work and a closer relationship between teacher and students, favoring both teaching and learning. Thus, there was the questioning of the possibility of using the method to identify changes in the relationship between teaching and learning with the application of PBL in an elementary school discipline of a public school in São Paulo's countryside. The research was developed at a public school, across four 7thgrade classes, with the voluntary adhesion of a History teacher willing to learn and work with the method and planning its use in the classroom in collaboration with the researcher.

According to Mamede (2001), PBL was originally conceived in an interdisciplinary learning structure, whereas Kelson and Distlehorst (2000) understand that there are many adaptations of the method and that it can be started in a single discipline, while motivated by a teacher, without institutional support and all the structural changes that the method suggests. Interdisciplinarity has the important role of establishing a systemic view of knowledge in the teaching and learning process, but its absence does not mischaracterize the PBL method, which has the use of problem situations, research, group work, and the teacher acting as a moderator in its essence.

Mamede (2001) also shows that the method was idealized in a self-directed learning proposal, in which students build knowledge from a problem that must be studied collaboratively, and students formulate their own learning objectives by appropriating significant knowledge. Self-directed learning is used only in one of the PBL phases; therefore, we must emphasize that it is not a self-learning method. Despite privileging many student-centered activities, this article demystifies the concept of the method's self-direction to point to the relevance of teacher mediation at each stage of the process, which also includes the role of closing the subject with the establishment of summaries on everything explored and worked on, highlighting the fundamental aspects of the subject. Through dialog classes with students, the teacher makes use of varied resources and strategies to systematize the results produced throughout the study. Although PBL's pedagogical origins cannot be attested, there is the belief that the learning principles behind it are similar to the propositions of the philosophers' John Dewey, who believes that experience is an important contribution to learning, and Jerome Seymour Bruner, recognized for his experimental studies on perception, memory, and thought (PENAFORTE, 2001; RIBEIRO, 2008; VEIGA, 2015).

For Munhoz (2015), with the development of technology and the strong growth of social networks, PBL emerges as a new way of teaching and learning, in contrast to traditional methods. Duarte (2010, p. 38), however, deems the new educational proposals "negative pedagogies", given that they deny traditional education, and criticizes the idea of the student as a central reference for school activities, and the teacher, a mere "organizer of activities promoting what some refer to as the negotiation of meanings constructed within the students' daily lives."

Interestingly, Savin-Bader and Major (2004) present the teachers' role as essential to the method and claim that they must have complete control over the content and the process. Masetto (2011) believes that the teacher collaborates so that the student researches, knows the sources of information, dominates the way to access them and learns how to select, compare, criticize, and integrate them into their intellectual world, but it is still a source of information and practical experience to your student.

Teacher and student are partners in the construction of knowledge, empathy is fundamental, and, through it, the dialogue is opened so that the teacher knows the difficulties, demotivation, and lack of interest of the student, assuming an attitude of pedagogical mediation. Park (2006) also understands that the role of the teacher and cooperation through group activities are two of the main characteristics of PBL.

Criticisms of the use of PBL in the classroom arise as in any process of constructing educational methods and theories and are historical regarding changes in educational processes. According to Saviani (2010), in Brazil, the reform of primary and secondary education began with the Proclamation of the Republic in 1889, seeking to reconcile literary and scientific studies – such reform was widely criticized. In 1932, the main Brazilian newspapers published the so-called "Manifesto dos Pioneiros da Educação Nova," (Manifesto of Pioneers of New Education) and its reception was both controversial and highly criticized. In 1947, a commission was created to elaborate the Lei de Diretrizes e Bases (LDB, Law of Guidelines and Fundamentals), published in late 1961. Its members belonged to a modern humanistic pedagogical current, represented by the Pioneiros da Educação Nova (Pioneers of New Education), and the teaching decentralized orientation prevailed, with the states keeping their autonomy. The 1960s served as the stage for intense educational experimentation, with a renewed pedagogical concept. In 1964, Brazil was dragged into a troubled political moment when the military regime ascended, which sought economic development with a technicist pedagogy inspired by the principles of rationality, efficiency, and productivity, a pedagogy that was also highly criticized, especially in the following decade. The 1980s were marked by the search for theories opposed to technicist pedagogy and characterized by an expansion in academic-scientific production. In the 1990s, constructivism became a reference both for educational reforms in several countries, as well as school practices in Brazil, with its emphasis shifting from the results to the process, resulting in widespread criticism across a significant portion of scholars in the field. Thus, it seems to be part of the movement of changes that the method is also criticized; however, some criticisms disregard the allowance for flexibility in its application, including adjustments to the particularities of each social space. Given the complexity of the educational phenomenon, it is not a question of theoretical application in practice, but articulation between theory and practice. In this sense, reflecting on PBL's essential principles – problematization, research, and systematization of information – streamlines educational action in the classroom and can provide the construction and appropriation of knowledge in a more fruitful way, resulting in learning.

Learning implies results, processes, and conditions, admitting great variety within each of these components, and its different combinations provide different learning situations (POZO, 2002). For Nérici (1993), learning means taking ownership of something not yet incorporated into the individual's behavior, resulting from their involvement in a given situation, producing lasting changes, as well as whatever was learned must be used in different contexts.

According to Godoy (2000), schools have frequently used expository classes, even if dialogued, aimed at the exchange of knowledge, and the content to be learned has been presented in its final form by teachers to students, many times depriving them the exercise of the most complex intellectual skills, such as application, analysis, synthesis, and judgment.

In 2014, the Plano Nacional de Educação (PNE, National Education Plan) reaffirmed the need to establish pedagogical guidelines for Basic Education and create a national base to guide the country's curricula. Thus, the Base Nacional Comum Curricular (BNCC, National Common Curricular Base), a normative document defining the essential learning for Basic Education students, was born, ensuring the development of some competencies, including:

> Exercising intellectual curiosity and resorting to sciences' individual approach, including research, reflection, critical analysis, imagination, and creativity, to investigate causes, develop and test hypotheses, formulate and solve problems, and create solutions (including technological ones) based on the knowledge obtained from different areas (BRAZIL, 2018, p. 9).

BNCC is organized by competencies expected to be developed in different areas – general competencies for Basic Education, specific competencies in each area of knowledge, and specific competencies related to each curricular component –, as well as by skills to be developed through the

objects of knowledge (contents). The organization resumes the discussion of a curriculum by competencies and, as a consequence, the debate about attitudes, values, and, above all, what students should "know how to do". In this context, it is considered that "knowing how to do" is not necessarily a technicality resumption, instead, it can be a learning process contextualizing the knowledge learned in concrete situations of use, aiming at an integral formation and the full exercise of citizenship.

Within this context, we understand that PBL can present itself as a possibility for this new educational moment. The method arose to expand students' knowledge and skills development and serve as an alternative to ineffective classes in training students. It is, therefore, a movement in search of means to face the difficulties found in the relationship between teaching and learning but cannot be considered a definitive solution for all school issues, especially given its variables and complexities.

The learning process involves the appropriation of information and knowledge, as well as the development of skills to establish new relationships and obtain new references to interpret the world in which we live, making use of such information and knowledge.

For Ribeiro (2008), PBL emerges as an alternative for the construction of knowledge, given that it is a teaching and learning methodology in which a problem is used as the beginning of the discussion of a concept or content, under the teacher's direction regarding the material produced by small groups of students, motivating them to research. A large part of the learning process takes place in contexts of social interaction, determining the direction and meaning of what is learned. Collaboration promotes the desire to learn and benefits students with certain difficulties, without prejudice to those more experienced. With it, better questions and answers arise due to mutual help and the joint construction of new arguments and ideas that would not have come to life individually (POZO, 2002). The interaction between students favors the acquisition of knowledge and increases the quality of learning. Some examples are the better ability to negotiate in search of agreements that satisfy the parties involved, the ease of communication, and mutual help (Bonais, 2003).

Contemporary society imposes an innovative and inclusive approach to the promotion of collaborative learning networks, which, according to Duch, Groh, and Allen (2001), figures as an essential feature of PBL, which can help students to become more articulate, autonomous, and skilled to develop social relationships. For Oliveira (2010), the methodological procedures allowing active learning recommend teachers' and students' participation in the teaching and learning relationship, with the goal of forming active agents in society who are able to identify problems and seek plausible solutions.

The idea of working with PBL, however, often evokes hostile reactions, and Boud and Feletti (1999) suggest that the resistance towards the use of the method reflects the anxiety of educators in obtaining good results, which are not always immediately achievable, as well as the discomfort due to the break with the existing standards, giving rise to concerns regarding the changes predicted by the method.

Another constant concern of teachers starting their work with PBL is related to students' behavior while working in groups, assuming that they take advantage of the activity to socialize. However, teachers experienced in the method report that these concerns are usually unfounded and the use of PBL also eliminates a number of behavioral issues, as many of them occur when the student is bored, distracted, and disinterested (LAMBROS, 2004).

Although PBL was born within the health area and is mainly focused on Higher Education, Ribeiro (2008) considers that its principles allow for its use in other areas of knowledge, making it also viable for Basic Education. In the 1990s, Samford University pioneered the use of PBL in the arts and humanities area, and the Illinois Academy of Sciences and Mathematics (IMSA), which caters to students with talents in mathematics and science, became involved with PBL and established the Problem Based Learning Center, which serves as an educational PBL laboratory since 1992. In this sense, there is a growing interest in the application of the method in Basic Education, but there is little research reported mentioning experiences with PBL other than in Higher Education (SAVIN-BADEN; MAJOR, 2008).

Barell (1998) points out that many teachers in the United States have already challenged their students to experiment with teaching and learning strategies based on PBL. 3rd grade students at Bradford Elementary School in Upper Montclair were invited to reflect on issues such as: Why do sun rays come from outer space? Why are buses painted yellow? How did people dress up thousands of years ago? 6th grade students at Solomon Schecter School in Bergan Country used one of PBL's basic elements to promote research, generate their own questions, and report their findings on mountain formation. 10th

grade students at Dumont High School in Dumont researched and raised hypotheses on bacterial formation; 12th grade students at Jefferson Township High School in Oakridge studied presidential candidates for their political science class, and 12th grade chemistry students at James Caldwell High School in Caldwell studied whether or not the construction of a nuclear power plant in their community should be approved.

In order to identify the works related to the use of PBL in Elementary Education, the investigation started with a literature review carried out across three sources: international and national scientific articles, national theses and dissertations, and international and national books. Considering that the research took place in a school environment, we searched for articles, theses, and dissertations containing the acronym "PBL" in any field, as well as the term "school" in their summary. We chose to use the acronym PBL in English, as the method is recognized worldwide by its English acronym, and abstracts published in Brazil are generally also presented in the English language. The word *school* was used for the search within the international database, as Elementary Education may be listed as *Elementary School*, *Primary School*, *Middle School*, or *Secondary School*, but the word *school* is always listed. The acronym PBL was used in the search for international book titles, while searches for national books were performed including titles containing the expression "*Problem-Based Learning*," with a hyphen; "*Problem Based Learning*," without a hyphen; in Portuguese, "Aprendizagem Baseada em Problemas;" and containing the acronyms PBL and ABP.

The search returned 37 articles across the international database *Science Direct*, from which nine were selected after further reading of the abstracts. The articles dismissed either dealt with Project-Based Learning, Computer-Based Problem-Based Learning or did not explicitly mention the use of PBL. We could also observe a higher incidence of the application of the method in undergraduate courses in Africa and Asia for subjects such as physics and mathematics. The articles showed that the method is effective, especially regarding communication skills, group work, and reasoning. It is noteworthy that the articles seeking to compare PBL's classroom use with the so-called usual method concluded that students felt more motivated regarding their studies, and their reasoning skills and conceptual development were also superior in PBL classes. The articles did not introduce the teacher's role in the process, as well as they did not present the teaching perspective, since the focus of the investigations was on the method, and not necessarily on the possibilities and challenges that the method might raise to the teaching and learning relationship.

The search returned five articles across the *Scientific Electronic Library Online* (SciELO-Brasil) national database. It was possible to identify that all articles regarded experiences with Higher Education, mostly related to the medical field. In general, PBL has been described as an important method for strengthening the teaching and student relationship, enabling improved use of the teaching and learning relationship, although not a definitive solution for all educational issues. The teacher starts to develop an important collaborative role with the groups of students and may feel cornered if not adequately prepared for the intense interaction that occurs as part of the method, given the unpredictability of the questions. However, the potential for the rise of unforeseen doubts results in the increased opportunity for the teacher's professional improvement. It is noteworthy that the approach to the teacher enhanced by PBL inflicts less suffering on the student, who feels reassured with the learning process.

The search across Biblioteca Digital Brasileira de Teses e Dissertações (BDTD, the Brazilian Digital Library of Theses and Dissertations) returned 13 papers, including 3 theses and 10 dissertations. In scientific studies, it was possible to identify that research is still incipient in Brazil and that the greatest incidence of studies occurs predominantly with adult students. Two works were developed in high school and one with students from Educação de Jovens e Adultos (EJA, Youth and Adult Education). In Brazil, no research was found on the use of PBL in Elementary Education. We must observe that one of the studies identified that the method provided greater interaction between students and teachers, favoring the teaching and learning relationship, but its implementation and development need to be adapted to each school's reality.

213 books on PBL were found in an American virtual library, 95 of which mentioned PBL (88 of them were in English, 6 in German, and 1 in Spanish). The others either referred to *Project Based Learning* or did not make any explicit reference to PBL. During the analysis of the titles of the books, 15 mentioned the medical field, where PBL was born. The survey also returned seven books mentioning

Higher Education, five containing information from Basic Education (Elementary and High School), and only four had "Elementary Education" in their title. The latter four books have been analyzed and show that, although PBL was created with a focus on Higher Education, it is also applicable in Basic Education and that, although the method is only used in few schools, its initial results are encouraging and are effective. The authors highlight the importance of the teacher throughout the process, especially in the creation of problem situations and metacognitive questions, aiming to contribute to the development of critical and reflective thinking in students, thus, making learning more meaningful.

Six books were found and analyzed in Brazil. The use of PBL was discussed in different areas of knowledge, such as administration, accounting, and medicine, but always regarding Higher Education. Experiences with undergraduate and graduate engineering students were found in Brazil. Ribeiro (2008) addresses the method's fundamentals, characterization, and process, including the role of the teacher and students. According to the author, one of the greatest challenges concerning the method is in changing the nature of the teacher's work, who must choose and create open problem situations so that students can develop collaborative activities, as well guide and interact with the students at the metacognitive level, questioning their superficial reasonings and vague and mistaken notions. As an advantage, PBL would "favor the acquisition of knowledge in a more meaningful and lasting way" and, as a disadvantage, there would be "imprecision in the knowledge of the most advanced theories" (RIBEIRO, 2008, p.41).

Araújo and Sastre (2009) organized a work highlighting experiences with PBL in Aalborg (Denmark), Maastricht (Netherlands), Valld'Hebron, Barcelona (Spain), and an academic project by USP Leste, in São Paulo, Brazil. The initial results of the project demonstrate the students' involvement with the study and the quality of the knowledge produced.

Martins and Espejo (2015) presented reports of three experiences using the method. The first was in Singapore, at the Republic Polytechnic educational institution; the second took place at the School of Arts, Sciences and Humanities of Universidade de São Paulo (USP), which pointed to advantages in the use of the method given the possibilities it creates within the collaborative work. The third experience happened at USP's Faculty of Economics, Administration, and Accounting. A teacher reports that the class system, as it was, was wearing out, and there was the need to transform the discipline into something more practical. The point is that the teacher needs to adapt to a method that encourages him to work with the unexpected, taking a challenging path. The integration of theory with practice is highlighted as its main advantage, as well as the possibility for teachers to also work in partnership.

Veiga (2015) gathers results in four educational institutions, whose names were not mentioned, with the use of the method. PBL is a pedagogical alternative that breaks with the linear, complete, and transmissive logic of knowledge, stimulating the active participation of students with knowledge integration and encouraging continuing education. It is a more humanized and dynamic way of teaching, and the greatest challenge of the method is within the teacher, with the need to promote continuing education to teachers.

A difference was observed regarding the teacher's role. There are authors, such as Tomaz (2001) and Ribeiro (2005), who value and defend the teacher as an important mediator in learning, emphasizing the relevance of the teaching work for the development of the student; on the other hand, Munhoz (2015) explains the role of the teacher as an adjunct in the learning process, which the student should be allowed to self-direct, leading to the strengthening of some criticisms, such as those elaborated by Duarte (2010).

The literature review allowed for the understanding of the production regarding the method, and it was possible to infer that there is a lack of works reporting the use of PBL in Elementary Education. Such scarcity motivated the research, which aimed to identify the changes in the teaching and learning relationship with the application of the PBL method in an elementary school discipline of a municipal public school in a city in the countryside of the state of São Paulo.

Based on Barrel (1998), it is believed that the use of the method involves important considerations, such as a school culture focused on research, the degree of commitment of those involved with the principles of the method, the resources and time available, and the students' ability and maturity to work collaboratively. These aspects are relevant to enhance the engagement of both teachers and students in the production of knowledge within the school.

METHODOLOGY

This was a collaborative research with a qualitative approach. It used the observation of the place, subjects, and materials; the active listening to the ministering teacher, knowing their concerns and work, as well as the investigation of their perceptions about the use of the method, as procedures for the production of empirical material.

Knowing the feelings of the participating teacher was important, which is why interviews and narratives were used as part of the research instruments; but it was also necessary to know the results from the students' perspective. A survey approach was chosen, given the large number of subjects.

According to Ibiapina (2016), collaborative research is recent, since the investigations built in this perspective emerged in the 1980s with the organization of knowledge originated from the participation of members acting collaboratively.

To the author, three currents to define the genesis of collaborative research were identified. The first, points to the construction of collaborative scientific knowledge between researchers and professors, emerging as a theoretical-methodological alternative for the development of action research when organized with collaborative intentionality. In this case, it is usually classified as collaborative action research or collaborative action investigation. The second current follows the perspective of network research and practice communities, assuming that the research must be built by researchers and teachers, from the elaboration of the problem to the analysis and presentation of the results. The third current argues that collaborative research is based on the guiding principles of research in a critical perspective and loses its link with the epistemology of action research. It suggests that teachers can participate in the problematization, organization, and production, but not necessarily in the three movements with the same intensity as the researcher. However, interaction is necessary for the production of knowledge about educational practices guided by critical reflection, in which reflective processes are necessarily collaborative.

Oliveira (2017) understands that collaboration is a movement of mutual interaction in an exchange of ideas and thoughts in a relationship free from hierarchies, favoring the interdependence of group participants while carrying tasks out.

For Ibiapina (2008), collaborative research in the educational area is investigating a research object proposed by a researcher to a teacher motivated to reflect on his own practice. This means that the teacher is not the researched subject, but a participant and co-producer of the research, establishing interactions between their skills and those of the researcher in search of the context transformation within the school and the society in which they are inserted. Collaborative research requires the involvement of schoolteachers in projects that face the challenge of changing school practices and contributing to the development of their participants. It is an opportunity for teachers to participate as co-producers in the research, without necessarily becoming researchers.

The meetings between researcher and participants are part of the collaborative research process, which, according to Oliveira (2017), corresponds to the moment when the researcher socializes the objectives and issues of the investigation, seeking the voluntary engagement of the group.

The collaborative research presents three essential conditions from the perspective of Ibiapina and Bandeira (2017): 1) the participants do not necessarily have the same functions in decision-making during the research; 2) negotiations can take place throughout the research, depending on the need for each situation; 3) involvement takes place through the opportunities of sharing meanings. Thus, the relationships are actively constituted through the participants' critical language.

In collaborative research, the "researcher and participants become partners in the research process," therefore, the collaborative research is determined by the participants' involvement, joint decisions, as well as interpretations and reflections built through collective discussions (FLAG, 2016 p. 70).

According to the works consulted, a collaborative research must necessarily meet four basic premises: 1) being carried out collectively; 2) participants must be volunteers; 3) all voices must be heard; 4) the results need to be discussed.

The investigation presented here is characterized as a collaborative research, since it was originated from a volunteer teacher's need, despite being initiated by the researcher's intention, aiming

to investigate aspects of educational practice. The previous format in which the classes took place led to demotivation, lack of interest, indiscipline, and little involvement on the part of the students, which is why the teacher expected to change this scenario with the use of PBL. During the second semester of 2017, the teacher observed three classes presented by the High School researcher, allowing for the discussion of what was observed and reflections on the possibilities the method could provide for History classes. Several meetings were held in order to create the materials that would be used by students in 2018, as well as to discuss the needs for changes that arose throughout the process, at recurring times, before they were implemented. The results were analyzed jointly, and the teacher had the opportunity to comment on the final text.

The instrumental set can be described as follows: 1) documentary analysis, similarly to the curriculum of the Municipal Education Network, materials produced collaboratively (researcher and teacher) and used as a didactic-pedagogical resource by the teacher, reports produced by the students during the application of the method and final grades provided by the School Unit; 2) initial interview with the teacher responsible to identify their previous knowledge about the method, intermediate interview aiming at identifying the positive and negative aspects, as well as the necessary changes for the second semester, and final interview to know his impressions about the developed PBL method in the school year; 3) narratives of the collaborating professor, collected during the process, in order to identify the progress of the works through his critical-reflective look; 4) classroom observation to verify how the method was being used and to discuss possible changes with the teacher to optimize the results, without the lack of characterization of PBL; 5) questionnaires with students at the end of the school year to find out what changes were felt in the relationship with the teacher in the classroom and their perceptions of the knowledge acquired.

To carry out the research, we had to seek the consent of the Municipal Department of Education, the authorization of the School Unit, the approval of the project in a Pedagogical Meeting, and a volunteer teacher. After receiving all the authorizations and having the approval of the Research Ethics Committee, visits to the school started. He was a volunteer History teacher, with a degree (2008) and a bachelor's degree (2009) in History. The interest in research led him to join a postgraduate program, defending his master's dissertation in 2013. With the expansion of the federal technical education network, the teacher envisioned the possibility of joining the teaching career. In search of teaching experience, he took the exams to become a municipal teacher and began his teaching career in 2015. The following year, he was transferred to the school where the investigation was carried out. Although the teacher's initial intention was to obtain experience in the classroom to plead for a federal teaching career, he was inspired by the Elementary School, above all, regarding the didactic and pedagogical approaches aimed at the adolescent public. From his initial experience, the teacher has been developing reflections on formal education across this teaching stage, which led him to show interest in this research and volunteer as a participating subject.

To plan the classes, which follow processes with defined steps and reports, it was necessary to know the curriculum so that problem situations could be created collaboratively, contemplating the content provided by the Municipal Education Network. The problem situation can be a text, figure, table, chart, graph, or any other information created by the teacher, which is used as a starting point for the use of the method.

The curriculum with the objectives of the History discipline states that, from the problematization of social relations, there must be a critical and ethical interaction with reality, with historical knowledge serving as a parameter for the perception of transformations and self-recognition in the different historical contexts, political actions, social institutions, economy, and culture. PBL is in line with the curricular objectives, as it starts from a problem situation. It was from the curriculum that the teacher and the researcher developed a work schedule for the creation of problem situations that would lead students to learn about Western Antiquity, the High Middle Ages, Islam, and the Low Middle Ages. It was necessary to make an effort to study this historical period on the part of the researcher before discussions with the professor started.

The problem situations created by the teacher and discussed with the researcher before being presented to students are documents that initiate the learning process. To be able to develop the problem situations, the researcher and teacher agreed that it would be necessary to start with the question "What

should my students know?" and the knowledge and skills that students must develop, according to the curriculum produced by the Municipal Education Secretariat.

In possession of the problem situation presented in a contextualized form in the shape of written text and images, students individually read and noted their perceptions and understandings to later discuss with their group. This discussion took place orally but was later recorded, still in groups, in a specific document called Partial Report, which was corrected by the teacher and served as a guide for students, individually, to conduct research in search of information related to each problem situation. That moment had the intense guidance and mediation provided by the teacher. After gathering the researched information, the group of students prepared a summary organizing the knowledge learned in a document named Final Report. The results that made up this Report were presented orally by one or more students invited by the teacher and discussed with all other students in the room. After this process, a student from each group carried out a self-assessment and an assessment of their peers (of the other members of the group) in a document called the Leader Report. The working groups were selected by the teacher, and their participants had the task of choosing a leader for each problem situation, based on freely established criteria, that is, each group could select the most relevant criteria for each given moment. The groups should preferably indicate a leader for each problem situation, allowing several colleagues to benefit from this experience. Closing the cycle of the problem-situation, the teacher made use of a dialogued class, exercises, or another strategy that could serve as a systematization and consolidation of the contents and concepts developed throughout the work.

An initial interview took place and was meant to demonstrate the teacher's familiarity with the method and its expectations. An interview was also made with the teacher during the process, with the goal to be able to identify the needs that arose during the school semester and to propose solutions. Lastly, a final interview was conducted to find out about the possibilities and challenges that the method provided to the teacher and what their perceptions were regarding PBL at the end of the school year. The interviews were videotaped to capitalize on the advantage that the video allows the interviewee to be heard and their facial expressions and body movements are perceived, ensuring better quality in the data analysis. Subsequently, the interviews were transcribed so that they could be analyzed not only through audio and video but also in textual form.

Given that the teacher was responsible for applying the method in the classroom and the general objective of the research was to analyze the changes across the teaching and learning relationship with the application of the PBL method in an elementary level discipline at a public school, the teachers' narratives were an important methodological instrument for the development of the research, since it is strongly inserted in studies in the educational field because it allows the understanding of pedagogical practices, as well as human motivations and choices, considering their complexities.

Electronic messages were used to send the information to the researcher. Sometimes narratives were sent by e-mail; and many times, short texts were sent as instant messages via cell phone apps, which allowed the externalization of what the teacher was feeling at that specific moment. The exchange of messages also served to set up meetings, resolve administrative issues, exchange technical information about the method, and discuss the progress of the research.

The mobile app also allows for the use of audio, image, and video, but it was agreed between the parties that texts would be used exclusively when the subject was related to the research, facilitating the analysis, and, in more administrative cases, such as scheduling meetings, audios could be exchanged, which happened infrequently.

In addition to the teacher's narratives, it was decided to use observation as a methodological tool to get to know the school environment, check the infrastructure provided by the school for the development of PBL, perceive the students' reactions in the development of the methodological steps, for example, the way they organized the classroom and how they developed reports, research, and assessments.

For the research, several observations were made, on different dates, with two main objectives: 1) knowing the general environments of the school and the available infrastructure, such as the entrance hall, support room, boardroom, secretary, teachers' room, bathrooms, library, parking, classrooms, kitchen, and sports court; 2) understanding the development of the stages of the process and the way the students used to organize the classroom.

The narratives and interviews were used to get to know the teacher's perception about the use of PBL. The observation allowed the researcher to follow the development of the method within the classroom, but the students' voices also needed to be analyzed. Thus, we decided to use a survey as a methodological tool to get to know the students' feelings regarding PBL. The survey was applied at the end of 2018, after the release of the final grades, and comprised 11 multiple-choice questions with only three alternatives each. Reducing the number of alternatives meant making the survey more appropriate to the age of the respondents, reducing the possibility of misinterpretation, and contributing to the instrument being fully answered. Besides the questions, a space was made available for the students' comments, if any, regarding the method they experienced throughout the year.

PBL IN FUNDAMENTAL EDUCATION

The School Unit that hosted this investigation is located in the most populous area of the city, with 22 classrooms split into four blocks, three of them with digital slate, catering to 17 classes in the morning, 15 in the afternoon, and 14 in the evening. It has an indoor multi-sports court used in Physical Education classes, and the other spaces are intended for administrative activities, such as the boardroom, support, secretariat, and warehouse. The library provides few didactic and supporting books, maps, and magazines. The school does not offer a computer lab, which is essential for accessing a digital bibliographic collection, consultation on electronic pages, and the possibility of preparing a report and visual material for the presentation, which are fundamental procedures across the PBL method. There is no simple technological equipment in most classrooms, such as a projector and speaker, that allow teachers and students to use different teaching resources. The rooms are poorly ventilated and in precarious conditions. There is no door in some of them, jeopardizing the acoustics and impairing the students' attention, which is often carried away by external events. The teachers' room is small and quite uninviting to socialization. It relies on two large tables, old chairs, not standardized metal cabinets in the background, with many dented doors, others broken, and several objects scattered over them, creating visual pollution.

It was observed that the school infrastructure confirms what Luckesi (2011) had already highlighted in relation to the teaching conditions in Brazil. They are generally perverse, with an excessive number of students in the classroom, inadequate teaching material, unsatisfactory libraries, low teacher salaries, and unsatisfactory physical spaces. The scarcity of technological resources reduces the possibilities of research and considerably impairs the conditions for the good development of the method; however, it does not make it impossible, as students have textbooks at hand, even if in limited quantities.

During the year, the teacher worked with 6th and 7th grade students from the Elementary School, in the morning and during the afternoon, and chose to apply the PBL method only with 7th grade students in both periods. At first, the intention was to develop the research in only one class, but the teacher decided to apply the method across all four 7th grade classes.

Most students are between 12 and 13 years old, from low-income families, and 76% of them attend the 7th at their correct school age. 116 students split across four classes participated, 26 students in Class One, 34 in Class Two, 29 in Class Three, and 27 in Class Four.

The problem situations and initial models of reports that would be used by the students (the Partial Report and the Leader and Peer Assessment Report), as well as the criteria for evaluating the stages of each problem situation, were always created collaboratively with the researcher. Besides all the planning, the teacher also followed the whole process, prepared a closing addressing the main points to be understood, brought news the students had not yet researched to class, and corrected and returned the reports used, as well as an individual assessment, all included in the students' final grade.

The works using PBL were developed by the students according to four important steps: 1) individually reading of the problem situation proposed by the teacher, discussion of the problem situation in a group, and presentation of the Partial Report to the teacher to be corrected; 2) based on the correction of the Partial Report carried out by the teacher, they researched the didactic material available in the classroom, with the possibility of extending the research outside the school environment, and presented the Final Report about what they learned written as a group; 3) they made an oral presentation

creating possibilities for argumentation on the topics discussed in debate; 4) the leaders evaluated the process.

The groups were heterogeneous, formed randomly by the teacher, and modified only once, before the beginning of the second semester. According to Lourenço and Palma (2005), the heterogeneity of a group allows for the exchange of experiences, arguments, information, and shocks with different points of view, giving rise to situations of cognitive conflict to contribute to the students' education. Students who are usually dedicated to their studies are generally averse to working with colleagues with lower school performance, inappropriate behavior, and who relativize the importance of knowledge for their training. The teacher's testimony, however, demonstrated that, in some cases, a good interaction seemed to take place.

Given that the students would be working with PBL for the first time, the professor and the researcher understood that it would be interesting to apply a test problem situation and develop all the steps of the method so that the students would become familiar with the forms and the new way the classroom would work. We considered the application of a problem situation including updated and multidisciplinary content, but we came to the conclusion that a review of the content of the discipline taught at the end of the previous year would be more productive. Thus, a test problem situation related to time and different calendars was built, containing texts and images with spaces for students to fill in, as well as some simple questions. As a Final Report, the elaboration of a short text containing answers to the various questions related to the problem situation was suggested. For the research, didactic books used in the previous year were made available. Given the time constraints, students could not make the presentation and complete the Leader Report.

From there, we intended to apply the steps of the method, with two problem situations in the first two months and three problem situations in the other three months; but the teacher chose not to use PBL in the fourth quarter due to a large number of school activities disrupting the class sequence provided for across the school calendar.

The first problem situation was locating the city of Rome on the world map, identifying the time when it was founded, as well as the elements of life in ancient Rome. Students needed to say that Rome was founded in 753 BC, during the 8th century BC, then developed until the 5th century, that it is part of the Italic Peninsula, and stood close to the Greek and Egyptian peoples, previously studied. They should identify emperors, rulers, gladiators, and practices such as trade, construction, architecture, agriculture, as well as learn about Roman mythology, such as the legend of the founding of the city.

Some care must be taken during the creation of the problem situation. Wood (2003) calls our attention to the fact that the problems must be appropriate to the students' level of understanding, as well as inviting and interesting, including information that stimulates the discussion and encourages the search for answers to the questions presented while promoting participation in the search for knowledge. Thus, the first problem situation accompanied the current map of Italy, a text explaining what the country looks like today, together with some interesting data, a photo of the Colosseum in Rome, and questions regarding the building – which would refer students to the historical past –, the shield of the Associazone Sportiva Roma soccer team with the Lupa Capitolina, the wolf that nursed Rômulo and Remo, the mystical twin founders of Rome, and a photo of a Brazilian soccer player. In addition to the football team's shield and the player's photo, the problem situation included a short text with historical information about the club and what its shield represented.

There was an initial setback, mostly related to the reading because the text proved too long for the students, who would lose focus during the activity. Reading does not imply decoding written symbols, but rather extracting and attributing adequate meaning to the text read. It involves word recognition, general language skills, memory, inference, and the development of clear and organized expression of ideas (ANDRADE; CELESTE; ALVES, 2019).

The students' need for improvement within the reading realm persisted across the second problem situation; thus, we decided to modify problem situation three, adopting a new strategy. A large map was prepared, containing seven numbers and seven figures with short texts, which should be numbered in correspondence with the numbers on the map. The objective was to identify the territories around the Mediterranean Sea between the 8th and 3rd centuries B.C. and know the territorial expansions, political domination, the Punic Wars, and the commercial integration. The lack of interest in

reading written material was almost unanimous, even with shorter texts. Although there were some proactive students, the teacher had to perform a collective reading.

Problem situation four contained a *cartoon* that required analysis and interpretation, with a certain degree of complexity. The students ended up attending to minor details and not focusing on the most important things. The semester ended with problem situation five, dealing with the changes in Western Europe after the fall of Rome. A text and four images of archaeological remains from civilizations of the Middle Ages were presented, each from a different continent.

The first semester was a period of great learning, of mistakes and successes, promoting satisfaction with the possibility of creating new problem situations closer to that school's reality. For the second semester, we decided to continue with the creation of problem situations involving the student. Problem situation six included a short text on feudalism, with two images aimed to showcase the differences between the social classes of the High Middle Ages and today. There is a clear concern to bring history into the present, providing meanings, so the students can understand the historical reality.

Problem situation seven brought a text about the Black Death, with explanations on how bacterium Yersinia Pestis proliferated in Asia and arrived in Europe; and problem situation eight presented content linked to the Arab Civilization and the Crusades.

The Partial Report is the tool used to fulfill the second stage of the process and comprises the need for students to define the problem, identify the concepts to be studied, analyze the issue, structure and synthesize research proposals, as well as define the learning objectives. The purpose of this report is to help students highlight the most important issues presented by the problem situation and facilitate the study plan. An initial report template with four fields was created for students to fill out, in groups, with information related to the problem and group work. This model was used only in the first three problem situations, after which the model was rethought and changed.

The first Partial Report fulfilled its role in making the investigation instigating and in inciting debate among students. The first field of the report proposed the identification – in the problem situation text – of the aspects that the students considered to be the most relevant. Most groups filled in a large number of phrases, some did not write as much, and only one group left the field blank in problem situation three. The second field proposed the identification of the main points of the problem situation, but the students wrote down, in a few words, what they liked most about the text. The third field was intended for students to identify the most important topics to serve as a basis for the construction of the text in the Final Report, but some groups asked questions, and others left the field unanswered.

The last field served for the teacher and students to discuss the conceptual contents that should be researched, explain the students' possible mistakes, and present a structure for the construction of the Final Report.

Given the teacher's reports pointing out the students' needs, an attempt was made to revise the Partial Report and create a new model, more suitable to the reality of those students, without losing the essence of the report's proposal, which was presenting the results of the group discussion and serving as a guide for the research in the textbook.

The new Partial Report contained a table with areas for students to identify the time, place, and subjects within the problem situation, as well as what they were doing, how, and why. The main objective was to incentivize the discussion about the historical moment studied. Several sentences were also included for students to inform whether each statement was true or false. The objective was to make reading more dynamic and interesting for students, demanding that they seek the answer in the problem situation, leading to a discussion within the group and allowing for the appropriation of the information contained in the text included in the problem situation for the development of the research. The Report, thus, served as a reading guide, and students were motivated to read, understand, and discuss the problem situation. The change in the students' attitude may be related to the new proposals of the Partial Report, but we must consider that the teacher also felt that there was a process of familiarization with the new way of working, and thus new strategies for the development of the Report have also emerged.

The Final Report is the tool used to fulfill the third stage of the process, which can be the production of a text with the results of the research, possibly the solution of exercises proposed by the teacher, or any other final product prepared by the students after group research and discussion about the topic. For the research, we opted to receive an open text from the students, demanding that they

inform what they were able to learn from the research and discussions within the groups. The objective of the Report is to make students autonomous, capable of carrying out research in the most varied sources of information, enabling the group to present a consensual report listing the new concepts learned.

For students to be able to carry out their research, there must be an appropriate environment and bibliographic material. The school, however, did not have a computer lab so that students could research online, its library was very small, unable to accommodate a full class of students, and the collection was small; yet there were some textbooks that could be lent to students, so the teacher made two textbooks available per group. During the research, the teacher reported that the proximity to the students allowed for the identification of a series of limitations regarding reading and text comprehension, as well as difficulties in formulating the appropriate questions that would result in the appropriate answers to what was desired.

As there were no computers in the school, the proposal for the first final reports was to produce a handwritten text, with a basic structure for introduction, development, and conclusion, but the overall result was not positive. The students presented texts with few paragraphs, disconnected at times, demonstrating the need to develop skills in organizing ideas and knowledge of textual elements for the production of more structured and complete texts. As happened with the Partial Report, which demanded reflection on its effectiveness, the Final Report needed to be rethought and reorganized. The open text gave rise to an exercise that generally contained three open-ended questions to be answered in short texts, requiring research for the answers across the didactic material. An exercise with statements for students to say whether they were true or false was also included.

The results started to lean to the positive side, as there were greater participation and interaction between the groups. It is inferred that the short texts directed to the problem situation were more adequate to the material the students were able to deliver. The proposed changes do not de-characterize the method, as the main objective of the Final Report is the presentation of the research results. According to the good results presented, we suggest that the initial problem situations include more targeted reports, with more focused questions and activities that induce the students' interest in reading. As students become more confident, reports can become more complex until open texts are required.

The presentation of the results found by the students fulfills the fourth stage of the process and aims to socialize the knowledge acquired through research based on the bibliography. This step allows for the development of attitudinal contents such as the skills of organizing ideas, communication, respect for others, and the improvement of oral, body, and visual language. The oral exhibition provides learning opportunities for both the exhibitor and the audience, because, when exposing the content, the student needs to use discursive markers that guarantee the intelligibility of the message, supporting the cohesion of the structures, and thematic coherence, enriching linguistic their repertoire. The public will have access to the exhibitor's findings and be able to reflect and learn from them (SCHNEUWLY; DOLZ, 2013).

So that the students can prepare for a good presentation, it would be desirable that they have access to simple technological resources such as a computer equipped with presentation software and projector available in the classroom, but, unfortunately, resource availability was limited. Thus, it was then up to the students to make their presentations without any supporting resources, resulting in a tedious and exhausting activity.

The Leader Report is developed on the fifth stage of the process. The document is used for self- and peer assessment development, carried out by a student chosen by the group at the beginning of each problem situation, accompanied by the teacher, in order to identify the mistakes found during the performance of all tasks of each of the problem situations, and lead to group reflection, reorganization, and suggestion of strategies for overcoming possible gaps.

Created collaboratively between professor and researcher, the criteria for the evaluation of leaders were: 1) participation in discussions inside and outside the classroom; 2) respect for the opinions of other members of the group; 3) contribution to consensus and organization; 4) carrying out the tasks.

The students chosen as leaders met with the teacher and assigned a grade to each member of the group, including themselves, for each of the four criteria mentioned, as well as a final grade,

considering the individual grades average. They should also complete four small tables stating: 1) how they contributed to the group's performance; 2) possible improvements; 3) what challenges arose and how they sought to overcome them; 4) how each student's ethical attitude was within the group. These fields were not worth a grade and were intended to lead the student to a reflection on their posture and that of each team member, understanding the importance of individual work for the success of the group. According to Sá (2001 p. 198), "the identification of gaps by the student himself in their knowledge base enhances the final result of PBL's learning experience."

This was the first opportunity that students had to carry out a self-assessment at school. The teacher gathered the leaders around him during class time, explained the importance and objectives of that assessment, and remained close to help them with any questions they might have. With observation we could identify that, before the students started to fill in each one of the tables, they reflected and thought about it; that indicates they pondered before externalizing their evaluations on the paper.

The closing is the moment when the teacher can perform an expository or dialogued class or even practice exercises aimed at deepening the most relevant concepts, highlighting the main points of the problem situation, and introducing trivia about the subject. This is the sixth and final stage of the process. The classes had been planned and prepared with audiovisual resources, containing photos, illustrations, maps, and videos, in some cases. The teacher situated the students within the historical context, showed pictures, and asked questions relating the historical moment to the present, bringing concepts and a series of curiosities, promoting an interactive, interesting, and fun class.

For the assessment, each problem situation had the scores computed, as shown in the Box below:

Box 1: Grades granted for problem situations.

	Grade
Partial Report	**2,00**
Organization	0,50
Reading	0,50
Notes	0,50
Student Involvement	0,50
Final Report	**4,00**
Concept	2,00
Appearance and calligraphy	0,40
Text and Syntax Structure	0,40
Orthography	0,40
Argument and assumptions	0,40
News and curiosity	0,40
Presentation	**4,00**
Orality	1,20
Respect for colleague's speech	1,20
Class participation	1,20
Knowledge sharing	0,40
TOTAL	**10,00**

Source: Prepared by Borochovicius and Tassoni (2020)

It is noteworthy that the teacher corrected the reports, participated in the presentations, and, for each problem situation, informed the grades with his comments to the groups, providing conditions so that the students could understand the reasoning behind those grades and had the opportunity to review their mistakes and improve the reporting of further problem situations.

The Partial Report and Final Report scores were addressed to each group, but the Presentation grade was collective for the entire room. The purpose of the single grade is to stimulate debate in the classroom, and not just hold the presenters responsible for the quality of their own

presentations. At the end of each two-month period, the arithmetic average of all grades granted for problem situations studied in that period was performed.

The leader and peer self-assessment score model can be seen in the box below.

Box 2: Leader Report note template

	Participation in discussions inside and outside the classroom	Respect for the views of other group members	Contribution to consensus and work organization	Performing tasks	TOTAL
Leader					
Student 1					
Student 2					
Student 3					
Student 4					

Source: Prepared by Borochovicius and Tassoni (2020)

Nine reports were analyzed regarding the leader's self-assessment and peer assessment for problem situation one. The average of the leaders' self-assessment scores was 8.28, with one giving himself a score of 6.0. In the peer review, students did not spare their classmates, with scores of 0, 0.5, 1.0, 2.0, 3.0, 4.0, 5.0, and 5.5 listed. Of 29 grades, 11 were below 6.0, for a total of 37.93%.

Box 3: Leader review notes

	Problem Situation							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Analyzed reports	9	9	23	17	23	23	22	17
Average of leader grades	8,28	7,67	9,04	8,74	9,23	9,20	9,15	9,29
Number of peer notes	29	28	83	68	87	87	82	65
Grades below 6,0	11	4	19	16	20	23	22	13
% of grades below 6,0	37,93%	14,29%	22,89%	23,53%	22,99%	26,44%	26,83%	20,00%

Source: Prepared by Borochovicius and Tassoni (2020)

The box above shows the results of the evaluations carried out by each problem situation leader. It is clear that the averages that the students attributed to themselves (Leaders' Average) was close to 9.0 and that, in most problem situations, just over 20% of the total grades attributed to peers was below 6.0. This high average of self-assessment can be seen as an overvaluation or the result of the responsibility taken by the student performing the leadership role and, consequently, that they have been more dedicated to the work under their supervision.

The diversity of performance samples allowed for a fairly confident diagnosis of the students' learning, reducing the possibility of errors as much as possible, but there is no strategy, technique, or instrument that may guarantee a perfect evaluation across the whole scope of the curriculum. The students also took an individual test, and the score for each two-month period was an average between the test scores and the assignments.

The students promoted are those who presented an arithmetic average equal to or greater than 6.0 in all subjects. Those who had one or two averages below 6.0 were promoted by the School Class Council (the collegiate body that deliberates on didactic-pedagogical matters, including the approval or retention of students who did not reach the defined objectives). Students with an average below 6.0 in three or more subjects were retained. Of all students, 67.24% were promoted and 32.76% were retained.

The results of the retained students were analyzed, demonstrating that 100% of the students in Class One had a better performance in History, when their grades were compared with the average of their scores across the disciplines of Portuguese, Mathematics, Geography, and Sciences. In Class Two, only one student, out of 13, had a lower average, but it is noteworthy that his highest average was in Sciences, with a grade of 3.0. In Class Three, one student, out of nine who failed, also had a History

grade below the average of other subjects. This was their worst grade (3.5), although their highest score, in Portuguese (5.0), was also below the necessary for their promotion. In Class Four, out of a group of seven, one student also scored an average lower in History than in other subjects – but this one, in particular, was also retained in Science and Geography (reaching an average of 6.0 in Portuguese and Math). Thus, as a general result, of a total of 38 retained students, we have that 35 students presented a higher average in History than in other subjects, for a total of 92.11%. It can be inferred, therefore, that, for most of the retained students, the discipline of History, with the use of the PBL method, was not the main responsible for their dissatisfactory results.

In only 26.32% of the retention cases, the average for the discipline of History was the highest among the disciplines analyzed; therefore, it is possible to infer that there was no facilitation since most of the averages are in line with the students' performance in other subjects.

The students promoted by the Council were also checked and, across 20 students, 18 (90%) presented a final average equal to or higher than 6.0 in History. Only one student in Class Three and one student in Class Four had an average of 5.5. When analyzing the final averages of the 28 students who scored below 6.0 in History, it was observed that only four (14.29%) had an average of 6.0 in any other discipline (Portuguese, Mathematics, Geography, and Sciences).

It is worth mentioning that 12 (31.58%) of the 38 students who were retained had a history of low attendance/evasion, represented by more than 25% of absences across the school year. With PBL manifesting as a procedural method, the low attendance can also be a hinderer to the student's development. Out of the 116 students, 41 (35.34%) had over 10% unexcused absences, which can be considered a significant low attendance index.

The teacher demonstrated a level of contentment with the use of the method, as he felt it contributed to a closer relationship between him and his students. This allowed for the addressing of students' comprehension issues during the process, which did not happen in expository classes; there was also the perception of some limitations by the students, such as reading and understanding the texts included in the didactic material.

From the students' perspective, 49% said they enjoyed working with the method, 31% did not express an opinion, and only 19% reported that they did not like participating in classes with the use of PBL. Out of those, 30% claimed that they would have liked to choose their team members. Through the analysis of the students' answers, it is clear that the school invests little in collaborative work; thus, the students' resentment regarding group work is apparent. A percentage of 72% of the students admitted that the feedback from the work was essential so they could understand their mistakes. Only 16% of the students declared that they did not even bother to read the feedback. It is interesting to point out that 43% of students claimed to have felt more motivated to study, a percentage much higher than the 18% who felt demotivated. The questionnaire also revealed that 43% of the students felt closer to the teacher, although 41% of the students did not perceive changes in relation to proximity.

FINAL CONSIDERATIONS

PBL has been studied in several countries and used mainly in Higher Education, although there are reports of its use in High School and few applications in Elementary School across America. Changing the teaching and learning method is laborious and gives way to anxiety, fear, and lack of confidence, but it also opens opportunities for overcoming challenges imposed by a society in constant transformation. By itself, the method is not sufficient to ensure better teaching and learning quality, but it allows for a greater approximation between teacher and students, enabling the discovery of difficulties that arise throughout the process and the work towards their solution.

Although PBL was originally created in an interdisciplinary and self-directed learning structure, it can be used (with modifications) without moving away from its essence, there is, group activities based on a problem situation, enabling the development of reflective thinking, research, and the exchange of knowledge and experience between people. The teacher does not lose their role. Instead, they are joined by all other participants who democratically present their contributions to the construction of each student's knowledge.

The classroom is a space for social interaction, and PBL favors work in groups that involve thinking, acting, and feeling, intensifying the relationships between students themselves, and between the

teacher and the students with the clear objectives of driving research, debate, and leading to further understanding of the subject studied. Given the fact that the method stimulates research, there is an investment of time in the development of readings, records in reports, group discussions, research, text production, presentations, debates, and self-assessments that mobilize further action from the student, boosting a commitment and involvement that can directly impact the image that students build of themselves as learners and their established relationships with the knowledge and learning itself.

The method started with the analysis of the History curriculum, the planning of classes, and the creation of problem situations. It was important to negotiate on the creation of a planning, both to explain what students need to know considering the curriculum of the State Education Network, and in relation to the complexity of the topics to be addressed. It was also imperative that the class schedule was observed, and not only regarding recess days and holidays, but also the pre-scheduled dates for council meetings and parent-teacher conferences, to clearly obtain the number of possible classes for the development of the work under the method. We also had to keep in mind the constant movements of students transferred to and from school, as well as between classes, at the beginning of each school year, to close the workgroups and start activities, following the steps of the method without jeopardizing the pedagogical work, in general, as well as the development of the method itself, since the whole process is based in group work.

Factors external to the classroom, such as the scarcity of books and adequate collaborative spaces in the library, which stimulate research, have proven to limit the teaching and learning processes. The absence of a computer lab prevents the development of scientific research with the use of the internet, the typing of the text for the Final Report, and the creation of audiovisual resources for the students' presentation. The constant lack of teachers and the absence of proposals for optional activities to be carried out by students at these times bring an idleness that potentiates conflicts, demanding time and energy for mediation from the teacher responsible for the next class. Also, the time required for students to regain focus, concentration, and attention in class is greater, impairing their possibilities for learning. It is also noteworthy that, although the Class Council is relevant for qualifying the teaching work, as well as for the evaluation of the teaching and learning processes, the meetings could be held at alternative times, avoiding the suspension of classes.

Students' absences also interfere with good learning, as the work is expected to be procedural and collaborative. Reading the information contained in the textbook is not enough to unlock all the knowledge produced during the class. If the student depends on transportation to go to school, the interruption of the service ends is highly detrimental to his attendance and consequent participation in the tasks and activities developed in the classroom.

The results allowed for the attesting that the students started moving towards a perception of themselves and the others regarding participation and collaboration, which promoted changes in posture concerning the group work, with signs of further individual commitment in favor of the collective. The empirical material showed the students' participation, involvement, and perception of better performance, although resistance towards the composition of the working groups was evident. It could be relevant in the case of an adolescent audience, that the teacher creates strategies allowing the groups to be set up collectively. This could boost everyone's commitment to group work, including the development of students' reflection and awareness of their actions.

By allowing students to grow closer, their needs became clearer to the teacher, enabling more effective interventions towards helping them with their questions and (mis)understandings. The method also enabled experiences within the field of human development – with the teacher focusing on the students' behavior and interpersonal relationships. Space for conversation was created in class and strategies were sought for the students to develop other attitudes towards their work in the classroom. To inspire the teacher to work with the method in their classes, we suggest that they pursue an understanding of the philosophical roots and objectives of each stage of the process, as well as observe the application of the method by an experienced teacher. With this being a proposal different from the usual, we also recommend that the teacher develops a test problem situation with the students, so that they can understand each step, get in touch with the forms that they will be systematically required to fill, and understand what is desired of them.

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