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Publicação Contínua

Project-based learning in initial teacher education: contributions for the professional development of elementary school teachers

A metodologia de trabalho de projeto na formação inicial de professores: contributos para o desenvolvimento profissional de professores do ensino básico

La metodología de trabajo por proyectos en la formación inicial de profesores: aportes para el desarrollo profesional de profesores de educación básica

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Abstract: This study aims to understand how Project-based learning, addressed in initial teacher education programs, is reflected in the practices and professional development of elementary school teachers, as it is a method that contrasts with students' conceptions about teaching and promotes the development of pupils' skills and knowledge. The study uses a multiple case study design, in which the main data collection techniques are interviews and document analysis. The results show that initial teacher education institutions are concerned with the integration of this teaching method in its programs, although its approach is insufficient for future teachers and beginning teachers to implement it with confidence. Data also reveal the need for greater monitoring by higher education institutions during teachers' induction phase, in order to support them during the constraints of this stage, encouraging the use of active teaching methods and contributing to an early stage of their professional development.

Keywords: Beginning teachers, Initial teacher education, Practicum, Professional development, Project-based learning.

Resumo: Este estudo tem como objetivo compreender como a Metodologia de Trabalho de Projeto, abordada na formação inicial de professores, se reflete nas práticas e no desenvolvimento profissional de professores do ensino básico, já que é um método contrastante com as concepções dos estudantes sobre o ensino e promove o desenvolvimento de competências e conhecimento dos alunos. O estudo utiliza um design de estudo de casos múltiplos, em que os principais métodos de recolha de dados são as entrevistas e a análise documental. Os resultados mostram que as instituições de ensino superior se preocupam com a integração desta metodologia nos cursos, embora a sua abordagem seja insuficiente para que os futuros professores e professores iniciantes a implementem com segurança. Os dados revelam também a necessidade de um maior acompanhamento por parte das instituições durante a fase de indução dos professores, de forma a apoiá-los nos desafios desta fase, incentivando a utilização de metodologias de ensino ativas e contribuindo para uma fase inicial do seu desenvolvimento profissional.

Palavras-chave: Desenvolvimento profissional, Formação inicial de professores, Metodologia de trabalho de projeto, Prática de ensino supervisionada, Professores iniciantes.

Resumen: Este estudio tiene como objetivo comprender cómo la Metodología de trabajo por proyectos, abordada en los programas de formación inicial del profesorado, se refleja en las prácticas y en el desarrollo profesional de los profesores de educación básica, ya que es un método que contrasta con las concepciones de los estudiantes sobre la enseñanza y promueve el desarrollo de competencias y conocimientos de los niños. El estudio utiliza un diseño de estudio de caso múltiple, cuyos principales métodos de recolección de datos son las entrevistas y el análisis documental. Los resultados muestran que las instituciones de educación superior están preocupadas por la integración de este método de enseñanza en los programas, aunque su enfoque es insuficiente para que los futuros profesores y los profesores principiantes lo implementen con confianza. Los datos también revelan la necesidad de un mayor seguimiento por parte de las instituciones durante la fase de inducción de los profesores, con el fin de apoyarlos durante los desafíos de esta etapa, fomentando el uso de métodos activos de enseñanza y contribuyendo a una etapa temprana de su desarrollo profesional.

Palabras clave: Desarrollo profesional, Formación inicial del profesorado, Metodología de trabajo por proyectos, Práctica docente supervisada, Profesores principiantes.

INTRODUCTION

Regardless of their pedagogical intervention experiences, future teachers and elementary school teachers face, in the contexts of their teaching practice, the need to resort to their scientific and didactic knowledge and pedagogical models, acquired during their initial teacher education (ITE), to prepare and plan tasks and activities for their pupils, and to reflect about their practices. The knowledge acquired during ITE and its subsequent application in teaching practices will contribute to their professional development, in a continuous process of learning and personal growth, guided by challenges of various kinds, especially at the beginning of their careers (Marcelo, 2009).

Regarding the educational practices adopted by teachers, Almeida (2015) criticizes the traditionalist approaches, essentially centred on the teacher, defending active teaching methods, centred on the pupils, based on socio-constructivist and interdisciplinary principles. It is in ITE that future teachers come into contact with diverse teaching methods, such as Project-Based Learning (PjBL), which contrast with the essentially teacher-centred type of methods they have experienced in their school paths. Mielkov et al. (2021) suggest the implementation of active teaching methods in ITE by professors, so that students can build their own knowledge, developing critical and reflexive skills, and realizing the potential of student-centred teaching methods.

Many teachers have resorted to the use of active teaching methods in their educational practices, such as the PjBL, which allows an interconnection of knowledge and contents from various curricular areas, to prepare pupils to become active citizens for the 21st century (Condliffe et al., 2017). However, teachers still show many difficulties in implementing this type of work with their pupils, even if they recognize and value active and collaborative learning methods (Diesel & Matos, 2019).

In this sense, ITE has a fundamental responsibility in preparing future teachers for the professional life in a variety of dimensions. Among other factors, the knowledge and skills acquired in ITE and their application in teaching practices contribute to their professional development (Tempera & Tinoca, 2022). In terms of scientific research, this is not only less carried out focusing on ITE contexts, but also focuses little on the beginning of teachers' professional practice (Príncipe & André, 2019). Thus, there is a need to investigate and reflect on ITE programs, seeking to understand the effectiveness of the addressed teaching methods, students' and teachers' appropriation and application of those methods, as well as its contribution to their professional development.

The main objective of this study is to understand the contributions of PjBL, addressed in ITE, in teaching practices and professional development of future teachers and elementary school teachers at the beginning of their careers. We seek to understand how future

teachers envision PjBL and integrate it into their teaching practices as students and, later, in their professional practice as elementary school teachers. It seeks to understand the nature and application of the approach of this method at ITE and how future teachers and beginning teachers mobilize it in the context of their teaching practices, as well as to understand its role in their professional development. As a final purpose, this study intends to make a grounded portrait of ITE programs, contributing to the enhancement of basic education teaching practices by improving the quality of teacher education programs.

Project-based learning in initial teacher education programs

Although there is no consensual definition of PjBL in literature, it can be seen as an active teaching method centred on the pupil, which uses projects to promote learning (Condliffe et al., 2017), assuming the involvement of all participants, in which they develop skills during the process of finding solutions through raised questions, brainstorming of ideas, establishing a plan, research activities, implementing the defined plan and communicating the obtained results (Choi et al., 2019).

In their study, Virtue and Hinnant-Crawford (2019) conclude that pupils value the work they develop through projects since it allows them to articulate the obtained results with the real world, being able to identify their practical applicability. For Chen and Yang (2019), PjBL is generally considered an effective active teaching method, promoting an increase of pupils' learning skills compared to expository and transmissive teaching methods. Choi et al. (2019) mention that the advantages of using PjBL may be beneficial not only for pupils but also for teachers. According to the authors, teachers who decide to change their practices from a more directive to a more student-centred model noticed an increase of quality of educational experiences they try to promote, leading to a growth of their own confidence and self-efficacy.

Internationally, the Organization for Economic Cooperation and Development (OECD) defines learning principles for a quality educational environment, which must be considered by ITE programs, and which place the student at the centre of the learning process, valuing their knowledge and promoting a horizontal connection between curricular areas (OECD, 2017).

According to Pietila and Virkkula (2011), the use of PjBL as an active teaching method in ITE courses can be beneficial, as it contributes to high-level cognitive development, involving students in problem solving of a diverse nature, as they search for innovative solutions, while experiencing planning, research and communication processes.

Not neglecting the importance of the theoretical component, Kavanagh et al. (2020) advocate a practice-based teacher education programs, facilitating problems' identification and judgment of

situations, thus promoting critical thinking and decision-making efficacy. ITE is, therefore, the privileged time and space for professional learning, favouring the articulation between theoretical knowledge and teaching practices (Amorim & Fernandes, 2018). In this sense, practicum during ITE programs is extremely important, as it allows students to confront the theoretical models approached in different courses with concrete learning situations, where the basis for a teacher's professional development is established through the knowledge and skills acquired from its application in a real context (Alarcão & Tavares, 2018).

Galvão and Reis (2002) recognize some difficulties inherent to a quality practicum, insofar as the schools where the internships take place and the ITE institutions often have different visions that are difficult to reconcile. The difficulties are enhanced by the pedagogical practices that students have the opportunity to apply, which are not very diversified and sometimes disconnected from the ITE approaches, focused mainly on the methods adopted by the head teacher of the class – the cooperating supervisor –, the professional in whose classroom students carry out their practicum. Bearing in mind these characteristics, the internship supervisor and the ITE institutions roles in the process are fundamental in the attempt to promote quality internship contexts, allowing future teachers to experiment diversified pedagogical practices in their practicum. In this way, Onyshkiv et al. (2021) advise establishing a greater link between ITE institutions and schools in order to align educational strategies and objectives for future teachers' practicum, by keeping them motivated and stimulating reflexive thinking in order to overcome the difficulties inherent to a professional internship.

The induction period and teachers' professional development

The induction period of a teacher's career establishes the transition from student to teacher, constituting itself as the entrance into the profession (Marcelo, 2009). Amorim and Fernandes (2018) mention the insufficient preparation provided by ITE on teachers' integration and socialization at the beginning of their careers. For these authors, ITE fails to adequately prepare students for teaching career integration, causing teachers to join school contexts with little knowledge about its culture.

The induction period can be promoter of several educational opportunities through the confrontation with a diverse generation of teachers in the same educational institution, but it is a process that proves to be difficult and not efficiently potentiated (Tickle, 2000). According to Tickle (2000), the difficulty of beginning teachers' integration in schools involves the tension between the practices they learned and developed during their ITE programs and the traditionalist practices and circumstances they find in schools. If, on one hand, school administrators expect new teachers to become

educational reformers, on the other hand, they do not give them the opportunity to do so.

Being globally seen as a period for great learning, but also punctuated by tensions in unknown contexts, Marcelo (2009) refers to the challenge that teachers face between the acquisition of professional knowledge and their own personal balance. Considering induction as a phase characterized by challenges, adaptation, discoveries and transitions, the author considers that beginning teachers have the difficult task of combining several factors arising from their practice, such as understanding the group of pupils they are teaching, creating a healthy classroom learning environment, acquiring knowledge about the curriculum, adapting to a new school context, planning their teaching strategies, and continuing to develop a professional identity.

To help overcome the challenges inherent to this phase, Marcelo and Vaillant (2017) reinforce the importance of induction programs for teachers who have recently completed their ITE, helping them in the transition from students to teachers. The authors highlight the need for this period to be more supported by schools' administrators and ITE institutions, taking into account the insufficiency of an informal induction. In this sense, Rudkevych et al. (2020) advocate the creation of a mentor who provides guidance and supervision to beginning teachers, constituting an important element in their professional integration. A study by Mitchell et al. (2020) involving 2000 beginning teachers who agreed to participate in an induction program, highlights the importance of the synergy between mentor and teacher, as well as the structure of the program itself. The authors advise developing programs focused on teachers' professional development, with a significant reduction of administrative requirements and bureaucratic demands.

A teacher's professional development can be seen as a long-term process, experienced by teachers, in interaction with the school environment, through formal and informal experiences, with the goal to improve their teaching practices and to promote educational changes for the benefit of the school community (Oliveira-Formosinho, 2009). Gorzoni and Davis (2017) consider professional development as being directly related to the specificity of the teachers' actions. The results of their literature systematic review demonstrate that teaching professionalism is associated with several factors such as specific professional knowledge, the individual expression of being and acting as a teacher, the professional identity development built from the teachers' actions according to social demands internal and external to the school, and the development of specific teaching skills acquired during ITE or during their educational experiences.

Being a teacher of several curricular areas, a specific feature of elementary school levels, should imply curricular integration, although teachers find it difficult to plan and implement teaching strategies that relate to different curricular areas, as can be seen in a study carried out by Duran et al. (2009). Taking into account their own characteristics, the elementary school teachers' professional

development is directly related to the pedagogical and didactical knowledge of the content to be taught. Recognizing a lack of practical references in ITE, Cruz (2017) mentions that teaching programs focus more on the theoretical level of the teaching practice, rather than on methods that favour teachers' professional development.

Vonk (1995) considers professional development as a complementarity between three distinct dimensions: (i) *the personal dimension*, centred on the teachers and on their individual growth and which encompasses knowledge about themselves and their own ideas about good teaching practices, (ii) *the knowledge and skills dimension*, concerning the processes of acquiring scientific knowledge, pedagogical skills and organizational skills for the teaching-learning process; and (iii) *the ecological dimension*, which corresponds to teachers' integration and adaptation to the school environment, envisioning themselves as agents of change. All these aspects are interconnected, contributing and converging together for teachers' professional development at an induction phase.

Considering ITE as the starting point for professional development and socialization of a teacher (Vidović & Domović, 2019), Bümen (2009) supports the existence of professional development programs promoted by ITE institutions, as they prove to be statistically significant for teachers' confidence and effectiveness, as well as for promoting changes in teaching practices. In her study, class management and PjBL were reported as the aspects that provided the most benefits for teachers' professional development.

Diesel and Matos (2019) recognize the effort dedicated to teachers' education and professional development as one of the educational policies priorities around the world. Teachers participating in their study recognize the necessity for a set of specific skills they need to acquire in order to work in innovative learning spaces, in which PjBL is a part, namely time, space and materials management, the ability to adopt greater curricular flexibility in their practices, and the attempt to maintain productive interpersonal relationships with their pupils.

METHOD

This study is situated in a phenomenological-interpretative paradigm. Cohen et al. (2018) consider that a study situated in this paradigm is concerned with understanding the subjectivity of human experience. Our objective is to maintain the integrity of the investigated phenomenon, making the effort to interpret it from the participants' point of view.

Given the characteristics of this investigation, the study presents itself as a multiple case study, as it focuses on specific situations that are supposed to be unique and special in certain aspects (Amado, 2017). The purpose of using this type of qualitative design is to understand the specificity of a given situation, not to define the general properties of a population, thus intending to produce knowledge about a particular object. By studying the processes and dynamics of future teachers and elementary school teachers in their

teaching practice contexts, the ultimate aim is to provide a better understanding of the specific cases: the nature of the training practiced by two ITE institutions.

Given the multiple case study design we adopted, it was relevant to analyse the work of two institutions with different ITE programs, but having project work as an inherent method in their curricula. Thus, an institution was selected where the approach to PjBL is carried out in an essentially theoretical and didactical way (InstA), and another institution with a more experiential approach to PjBL (InstB). The participants of this study were selected within the scope of these two ITE institutions, comprising students who were in the last year of their ITE programs and teachers in the induction phase graduated by these same institutions. Having developed this method with pupils at some point in their ITE was the criterion for selecting the students (8 from InstA and 5 from InstB), and having between 2 and 5 years of professional experience at this level of education and using (or have used) PjBL in their teaching practices, were the criteria for selecting beginning teachers (5 graduates from InstA and 3 graduates from InstB). Students and teachers were selected based on the suggestion made by the ITE programs' coordinators and practicum supervisors, who have a more in-depth knowledge of the work they have developed throughout their ITE and the work they continue to demonstrate in their current teaching practices. The participants' names are fictitious, maintaining their anonymity and data confidentiality.

Taking into account the defined objectives of this study, semi-structured interviews were carried out (i) with the ITE programs' coordinators of both institutions, in order to better understand the nature of PjBL approach in the ITE curricula, and (ii) with teachers in the induction phase, seeking to characterize the way in which they integrate PjBL within the context of their practices and to understand the role/importance of this type of work in their own professional development. Contributing to characterize the way in which future teachers integrate PjBL within the context of their practicum, focus group interviews were carried out with students from the two ITE institutions. All interviews were based on guiding scripts designed to allow participants to freely express their points of view.

Document analysis was also used as a data collection technique to reinforce and complement the interviews. It proved necessary to analyse two types of documents: (i) the ITE institutions official documents, namely the curricula, study plans, courses' syllabus and external evaluation reports; and (ii) documents produced by students and beginning teachers, such as lesson plans, written materials to support their practice, class records and reflexions, and their pupils' own productions within the scope of a project work.

In order to achieve the objectives of this study, there was an attempt to use two different data sources for the same object of study, in order to guarantee methodological triangulation (Cohen et al., 2018). Therefore, in addition to the interviews, document analysis

allowed us to obtain additional information, corroborating and clarifying what was mentioned by the participants.

In order to make the results as close to reality as possible, its analysis was carried out almost simultaneously with the data collection process. We performed a preliminary analysis immediately after data collection, with the purpose of reducing and organizing the data, thus proceeding with an analytical choice of the information. At this stage, impressions and opinions about the phenomenon under study, speculations, and hypotheses about what happened were registered. Since this was a preliminary analysis, all these aspects were performed intuitively, in a certain way. There was an attempt to organize all data as it was collected by coding it by topic or area of interest. It was only at a later stage that data was analysed in depth and categorized according to regularities and common aspects, taking into account the theoretical framework and the objectives of the study. This process translated itself in the immediate transcription of the interviews with the insertion of sidenotes corresponding to the preliminary data that was cross-referenced with the documents. The coding process and the identification of common elements constituted the starting point for creating topics for analysis and discussion of the results.

RESULTS AND DISCUSSION

In this section, the results are analysed and discussed in an integrated way, focusing on the cases of this study (the two ITE institutions), resuming the essential concepts developed in the theoretical framework and seeking to highlight the most relevant topics taking into account the defined objectives.

Advantages of Project-based learning

There is a notorious recognition of PjBL relevance for pupils' learning by future teachers and beginning teachers, as they seek to integrate it into their teaching practices. Reinforcing the perspectives of several authors about this method (Chen & Yang, 2019; Choi et al., 2019; Virtue & Hinnant-Crawford, 2019) the participants mentioned several advantages of PjBL such as the connection between pupils' interests and the theme of a project, real problem solving by trying to figure out solutions by themselves, motivation to learn, interdisciplinarity, and the development of several skills transversal to the curriculum in terms of organization and analysis of information, communication, collaborative work, autonomy and responsibility.

There is no marked difference between the characteristics mentioned by future teachers and beginning teachers, which reveals a common understanding based on their experiences with this method. Although future teachers are less familiar with this method, due to having less educational practice experience than beginning teachers, their conceptions do not reveal less appropriation of the advantages

of this method for pupils' learning. Bearing in mind that the participants had almost no contact with PjBL during their school paths, we can recognize that the effort to integrate this method in ITE programs is producing results in terms of disseminating this teaching method.

However, there are noticeable differences in the discourse of the two groups of future teachers. InstA's students showed greater ease in discussing this topic, reinforcing their speech with experiences acquired during the program, namely in the practicum stage. Célia refers to the work and spirit of cooperation that was created while carrying out a project with her pupils, highlighting their involvement in their own learning process. And Daniela states that PjBL helped pupils to develop their autonomy and to build the path for their own knowledge: "this construction of knowledge is from within, it is not someone who passes the knowledge on to them. They acquire skills to apply later when they leave school". We realized that the experiences they had during ITE were crucial for them in order to appropriate themselves of the advantages of PjBL, not only at a theoretical level but also at a didactical level, as suggested by Kostianen et al. (2018). On the other hand, InstB's students, whose experiences at ITE are essentially focused on experiential level, as a method practiced in some of the programs' courses, show more insecurity when referring to the importance of this method. Only Lara recognizes that it promotes a gradual development of learning and skills, but does not develop the idea. Facing the prolonged silence that was established within the group, they were asked about the importance of relationships and social skills that can be developed when working on a project. The head nods revealed that they recognize the existence of this aspect, but the topic was not developed or deepened by the participants. According to the programs' coordinators at InstB, project work experiences are provided to students since the first year of the program, in which several tasks of this nature are proposed within the scope of various courses. However, it seems that both students and teachers graduated by this institution do not recognize these experiential opportunities as being project work, feeling little familiarity with this method.

Project-based learning practices in initial teacher education

For the last fifteen years, both institutions have been modifying the structure and content of ITE programs, which includes granting a greater focus on the didactical component and learning experiences regarding active teaching methods, such as PjBL. According to the interviews and the analysis of some of the courses' syllabus, institutions seek to promote curricular integration, the approach of different teaching methods, within a practice-based curriculum (Kavanagh et al., 2020) integrating research and investigation activities.

Specifically, with regard to PjBL, institutions recognize its importance as an active teaching method, but demonstrate difficulty in integrating more project work experiences during the program, due to the demand and commitment that this integration presupposes from the institutions' professors of different scientific areas.

Despite the efforts shown by the institutions to offer a quality ITE, the voices of students and teachers graduated by these institutions sometimes don't seem to correspond to the institutional vision, when referring to the limitations of the effective approach of PjBL during the program. Seven of the eight interviewed teachers consider that they did not feel sufficiently prepared to develop project work with pupils after completing ITE due to (i) the lack of practical experiences, as the institutions' professors continue to use transmissive methods as a privileged teaching method in their classes, not giving them teaching models that they can replicate with their pupils; (ii) the weak connection between theory and practice, as some professors present theory disconnected from reality because they are not in direct contact to elementary schools' teaching practices; (iii) the in-depth approach during the program, as they feel that PjBL is one more method, in the set of several, theoretically approached in a superficial way and disconnected from the reality; and (iv) the imposed limitations to apply this method in internships, due to the school contexts' circumstances or the methods adopted by the cooperating supervisor. This last aspect is more evident in the InstB's graduate teachers' discourse, as they recognize several limitations of their practicum, since they were not given the freedom to implement certain teaching methods which they identify themselves with. Carla states that she didn't know about this method until ITE, but "in the internships it was not the methods that were applied in the class... I didn't have much experience with it". And Bruna refers that: "I had to follow the cooperating supervisor's methods, where everything was very standard... in the traditional teaching way".

According to the institutions' normative documents, as an integral and fundamental part of ITE, institutions seek to provide quality internship environments, in which students come into contact with the field of practice and develop their professional skills through the practical application of theoretical knowledge and reflection on their own practice, such as defended by Alarcão and Tavares (2018). This intention is sometimes not entirely feasible due to the high number of students per class and the limited availability of elementary school teachers to assume the role of cooperating supervisors, difficulties also identified by Galvão and Reis (2002). According to the interviews, institutions seek to promote and encourage students to follow active teaching methods and curricular integration in their practicum, but they are strongly conditioned by cooperating supervisors' work methods and routines.

Regarding future teachers, students from both institutions highly value the practicum component in the ITE, agreeing on the general opinion that it should be extended over time. They value the support of institutional supervisors and cooperating supervisors as well as

their constructive criticism along the way. However, with regard to the implementation of PjBL during their internships, the two groups of students differ on a large scale. All InstA's students had the opportunity to carry out project work with their pupils, considering that this possibility was due to the fact that the cooperating supervisor was already implementing this method. On the other hand, InstB's students revealed the little opening they found during their internships to experiment and apply different methods from the ones being used by the cooperating supervisor. In this way, they mentioned not having many opportunities to implement PjBL in their practicum. When analysing the documents provided by InstB's students regarding their internships, we did not find any mention of project work, as a pedagogical intention or as a method to be used, corroborating the aspects mentioned during the interview. The documents provided by InstA's students show PjBL included in (i) intervention plans, in which project work is assumed as a pedagogical intention to be developed with pupils, (ii) lesson plans, which include several project work moments, (iii) documents with project guidelines to assist pupils' researches, (iv) photographs of pupils' final products, within the scope of a developed project, and (v) assessment grids for pupils' project work.

The statements made by students from both institutions during the interviews demonstrate the importance they attribute to the practicum phase in their ITE, although not fully meeting their expectations. Regarding the work she developed during the internship, Elsa says that "it was important to see that it is possible to centre learning on pupils. And PjBL is one of the best methods to do so. It allowed us to understand what we can do as teachers". But Maria adds: "I only had the privilege of contacting with this type of practices this year. In the other internships it was a traditional method. Those who do internships in these contexts end up being at a disadvantage compared to the rest of the colleagues". Their discourse denotes a desire for institutions to provide contexts in which they have greater freedom to apply diversified methods, with which they had contact during the program. This aspect takes on greater relevance with InstB's students, who admit having had internships with many limitations imposed by school contexts and cooperating supervisors.

From initial teacher education to teachers' induction phase

After ITE, newly graduated teachers go through a career integration process that, according to the participants, has proved to be challenging. In general, beginning teachers mention limiting aspects such as the difficult adaptation to the new school contexts (Marcelo, 2009), the lack of time to prepare lessons due to institutional requirements (Tickle, 2000), and the lack of support to attenuate all difficulties.

These aspects result in constraints on their teaching practices and on the attempt to innovate their lessons through active teaching methods, given that it requires more preparation and dedication on their part. In addition to the aforementioned difficulties resulting from their teaching inexperience, the participants refer several challenges for implementing PjBL such as the class management, pupils' different learning rhythms, the curricular integration required by this type of work that presupposes an in-depth knowledge and mastery of the curriculum, and the adaptation to the new schools' policies that requires an additional effort and time.

All these constraints are exacerbated by the lack of a support that teachers feel from the institution where they graduated, which does not sufficiently prepare them for the challenges and difficulties they encounter at the beginning of their careers (Amorim & Fernandes, 2018) and, in some cases, on the part of the schools where they teach, which demands too much from those who are still adapting to the new educational environment. In fact, there was no evidence from ITE institutions for the integration into the teaching career of newly graduated teachers, regarding induction programs (Bümen, 2009; Marcelo & Vaillant, 2017), or established partnerships with schools for this specific purpose. The support that teachers refer to receive, is the result of their own initiative, when they require help from the institution's professors for pedagogical advice. The nature of this support is voluntary, so these professors cannot be considered as beginning teachers' mentors, as would be desirable (Mitchell et al., 2020). This is regarded as an additional effort from these professors, since it requires their availability for a task not foreseen by the institution.

A sustained professional development

For the beginning teachers graduated from both institutions, the contact with the PjBL was decisive in changing their previous conceptions about teaching and for their professional development. Graduated teachers from InstA value the experience they had during their practicum, which allowed them to realize the potential of active teaching methods for pupils' learning. Regarding the graduated teachers from InstB, this perception comes essentially from their teaching experience in the first years of the profession, not from ITE. By being placed in schools that encouraged the use of active teaching methods, such as PjBL, they realized its potential already in-service. Although they consider that the theoretical approach in ITE was important to provide teaching foundations, it was not enough to radically change the conceptions they had about teaching professionalism. This characteristic was aggravated by the transmissive teaching models they encountered during their internships.

The beginning teachers identified potential aspects and constraints for their professional development in the schools where they teach. One of the participants' most valued aspect concerns the sharing of experiences between the teachers of the schools. Informal meetings

and conversations with more experienced teachers have proven to be an asset to enrich their lexicon of activities.

The stated aspects fit into the dimensions that influence an induction phase teacher's professional development, as defined by Vonk (1995). The influences are felt on a *personal dimension*, through the development of teachers' self-concept and changes in their conceptions about teaching, on a *knowledge and skills dimension*, through the development of their teaching practices skills, and on an *ecological dimension*, through the influence of the educative environment and their adaptation to the school.

Another aspect mentioned by the participants is related to the need for additional training, as they consider ITE insufficient. Although the schools where they teach promote short-term trainings and workshops, several teachers from both institutions said they wanted to deepen their didactical knowledge and to expand their teacher education. For example, Glória mentions: "I would like to have more time to invest in my training and time is, at the moment, what I don't have. I would like to be able to invest a lot more, to read, to investigate... because now I begin to see some weaknesses that I would like to address". Due to the excess of work and the adaptation to the school on the first years of teaching service (Marcelo, 2009; Tickle, 2000), none of the teachers attended any additional training that met their needs or that they considered satisfactory. This is seen by them as a constraint for their professional development. Analysing the additional academic education offers from the participating institutions, both have academic masters, postgraduate programs and in-service teacher education initiatives, aimed at teachers who intend to invest more in their education. However, when analysing the access requirements to some of the academic programs, we detected ranking criteria based on years of service, professional experience or relevant curriculum in the area, which limits, in a certain way, the integration of beginning teachers in these programs.

CONCLUSIONS

Based on the results, we can realise that both institutions approach PjBL at a theoretical, didactical and experiential level, although one focuses more on an experiential approach than the other. Both institutions give balanced theoretical importance to PjBL compared to other teaching methods and it is didactically reinforced at InstA and experientially reinforced at InstB. In recent years, PjBL has gained some importance in these institutions' ITE programs in a didactical and experiential way, in addition to the theoretical component that was already being practiced. Regarding the application of PjBL in internships, this is left to future teachers' decision, depending on their interest on this method or the favourable conditions found in internship schools to do so. InstA's students consider that they had a solid experience of implementing PjBL in their practicum, revealing a mastery on the advantages of PjBL for pupils' learning, at a theoretical level, but consider that they

lack more practical experiences and a stronger link between theory and practice, so that they could feel more confident to implement this method in their future teaching practices. InstB's students reinforced the ITE's limitations to prepare them conveniently to work according to this method, due to the little degree of freedom they felt for experimenting different methods in their practicum, and the need for a greater depth of approach during the program, resulting in personal insecurities at a theoretical and didactical levels. Beginning teachers graduated from both institutions also feel that ITE is insufficient to prepare them for the implementation of PjBL. The experiences they had according to this method come from the internships, in the case of InstA's graduated teachers and from the professional experience, in the case of InstB's graduated teachers. In terms of support for teachers' professional development, both institutions have a varied academic offer, although neither has an induction program to support teachers at the beginning of their careers.

We verified that there is still a long way to go in optimizing the approach of active teaching methods in ITE programs, since future teachers and beginning teachers still show some difficulties in integrating these methods in their teaching practices. We consider relevant to encourage the use of PjBL during ITE and the induction phase, given this phases' potential to transform teachers' professional identity for the rest of their career and to promote their professional development.

We consider that teachers' professional development is based, to a large extent, on processes of self-perception about themselves, as teachers, and their didactical skills regarding pupils' learning. In this way, ITE institutions should value and contemplate activities in their programs that promote the development of active teaching methods skills, such as PjBL, through theoretical, didactical and experiential approaches, based on interdisciplinary and curricular integration perspectives, with the involvement of professors from various scientific areas. This approach should be extended to the first years of teaching service, as they should continue to accompany beginning teachers in their professional integration, helping them to overcome the inherent challenges of the implementation of these methods into their teaching practices and encouraging their continued use in the induction phase, given its transformative potential for their professional development.

There are some limitations to this study, mainly due to the current pandemic situation that the world is experiencing and its consequent restrictions, which are important to address. In addition to the interviews and document analysis, classes observations were planned, but the limitations of the presence of external elements in the school premises prevented this type of data collection. Classes observation would have been useful to gain a deeper understanding on how future teachers and beginning teachers integrate PjBL within the context of their practices, how they operationalize it and what difficulties arise in its implementation.

Although generalization is not our objective with a study of this nature, PjBL is a proven effective teaching method, so its approach and implementation should be taken into account in ITE programs. The challenges of the induction period are also known, so they should not be ignored or considered secondary by these institutions. In this way, we believe that the results of this study may also serve as a reflection for other ITE institutions, by providing indicators for changes that they may recognize as necessary to implement in their own academic offers.

REFERENCES

- Alarcão, I., & Tavares, J. (2018). *Supervisão da prática pedagógica - Uma perspectiva de desenvolvimento e aprendizagem* (2nd ed.). Almedina.
- Almeida, M. M. de. (2015). Desenvolvimento profissional docente no ensino superior. In A. Loss, A. P. Caetano, & J. P. Ponte (Eds.), *Formação de Professores no Brasil e em Portugal. Pesquisas, Debates e Práticas* (pp. 77–104). Appris Editora. <https://doi.org/10.17648/cbcs-2019-110597>
- Amado, J. (2017). *Manual de investigação qualitativa em educação* (3rd ed.). Imprensa da Universidade de Coimbra. <https://doi.org/10.14195/978-989-26-0879-2>
- Amorim, A., & Fernandes, M. J. (2018). A formação inicial, a prática pedagógica e o processo de se tornar professor. *Práxis Educacional*, 14(30), 85–110. <https://doi.org/https://doi.org/10.22481/praxis.v14i30.4362>
- Bümen, N. T. (2009). Possible effects of professional development on Turkish teachers' self-efficacy and classroom practice. *Professional Development in Education*, 35(2), 261–278. <https://doi.org/10.1080/13674580802568385>
- Chen, C. H., & Yang, Y. C. (2019). Revisiting the effects of project-based learning on students' academic achievement: A meta-analysis investigating moderators. In *Educational Research Review* (Vol. 26). Elsevier Ltd. <https://doi.org/10.1016/j.edurev.2018.11.001>
- Choi, J., Lee, J. H., & Kim, B. (2019). How does learner-centered education affect teacher self-efficacy? The case of project-based learning in Korea. *Teaching and Teacher Education*, 85, 45–57. <https://doi.org/10.1016/j.tate.2019.05.005>
- Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge Falmer.
- Condliffe, B., Quint, J., Visher, M. G., Bangser, M. R., Drohojowska, S., Saco, L., & Nelson, E. (2017). *Project-based learning: A literature review* (Unpublished Working Paper). <https://s3-us-west-1.amazonaws.com/ler/MDRC+PBL+Literature+Review.pdf>
- Cruz, G. B. da. (2017). Ensino de didática e aprendizagem da docência na formação inicial de professores. *Cadernos de Pesquisa*, 47(166), 1166–1195. <https://doi.org/10.1590/198053144323>
- Diesel, D., & Matos, J. F. (2019). Espaços educativos inovadores e o olhar dos professores para a ação docente. *Educação e Cultura Contemporânea*, 16(43), 375–395. <https://doi.org/10.5935/2238-1279.20190018>
- Duran, E., Ballone Duran, L., & Worch, E. (2009). Papier-mache animals: An integrating theme for elementary classrooms. *Science Education Review*, 8(1), 19–29.

- Galvão, C., & Reis, P. (2002). O conhecimento profissional dos professores: O estágio de Sofia. *Revista de Educação*, XI(2), 165–178. <http://hdl.handle.net/10451/4722>
- Gorzoni, S. de P., & Davis, C. (2017). O conceito de profissionalidade docente nos estudos mais recentes. *Cadernos de Pesquisa*, 47(166), 1396–1413.
- Kavanagh, S. S., Conrad, J., & Dagogo-Jack, S. (2020). From rote to reasoned: Examining the role of pedagogical reasoning in practice-based teacher education. *Teaching and Teacher Education*, 89, 102991. <https://doi.org/10.1016/j.tate.2019.102991>
- Kostiainen, E., Ukskoski, T., Ruohotie-Lyhty, M., Kauppinen, M., Kainulainen, J., & Mäkinen, T. (2018). Meaningful learning in teacher education. *Teaching and Teacher Education*, 71, 66–77. <https://doi.org/10.1016/j.tate.2017.12.009>
- Marcelo, C. (2009). A identidade docente: Constantes e desafios. *Revista Brasileira de Pesquisa Sobre Formação de Professores*, 1(1), 109–131.
- Marcelo, C., & Vaillant, D. (2017). Políticas y programas de inducción en la docencia em latinoamérica. *Cadernos de Pesquisa*, 47(166), 1224–1249. <http://publicacoes.fcc.org.br/index.php/cp/article/view/4322>
- Mielkov, Y., Bakhov, I., Bilyakovska, O., Kostenko, L., & Nych, T. (2021). Higher education strategies for the 21st century: philosophical foundations and the humanist approach. *Revista Tempos e Espaços Em Educação*, 14(33), e15524. <https://doi.org/10.20952/revtee.v14i33.15524>
- Mitchell, D. E., Kwok, A., & Huston, D. (2020). Induction program structures as mediating factors for coach influence on novice teacher development. *Professional Development in Education*, 46(5), 812–832. <https://doi.org/10.1080/19415257.2019.1643394>
- OECD [Organisation for Economic Co-operation and Development]. (2017). The OECD handbook for innovative learning environments. OECD Publishing. <https://doi.org/https://dx.doi.org/9789264277274-en>
- Oliveira-Formosinho, J. (2009). Desenvolvimento profissional dos professores. In J. Formosinho (Ed.), *Formação de professores – Aprendizagem profissional e acção docente* (pp. 221–284). Porto: Porto Editora.
- Onyshkiv, Z., Kodliuk, Y., Lesina, T., Malyna, O., & Kichuk, N. (2021). Areas of modernization of preparation of future elementary school teachers in the countries of the European community. *Revista Tempos e Espaços Em Educação*, 14(33), e15615. <https://doi.org/10.20952/revtee.v14i33.15615>
- Pietila, M., & Virkkula, E. (2011). Integrating therapy and practice according to PBL-based project designs in secondary vocational education of engineering and music. In J. Davies, E. Graaff, & A. Kolmos (Eds.),

- PBL across the disciplines: research into best practice. Proceedings from the 3rd International Research Symposium on PBL (pp. 54–63). Aalborg University Press.
- Príncipe, L., & André, M. (2019). Condições de trabalho na fase de indução profissional dos professores. *Curriculo Sem Fronteiras*, 19(1), 60–80. <https://www.researchgate.net/publication/346965927>
- Rudkevych, N., Hotsuliak, K., Marynchenko, H., Hryashchevskaya, L., & Ivanova, T. (2020). The development of teachers' professional competence within the conditions of modernization of the educational environment. *Revista Tempos e Espaços Em Educação*, 13(32), e14728. <https://doi.org/10.20952/revtee.v13i32.14728>
- Tempera, T., & Tinoca, L. (2022). Professional development of elementary school teachers at the beginning of their careers: The role of project-based learning. *Revista Tempos e Espaços Em Educação*, 15(34), e16945. <https://doi.org/10.20952/revtee.v15i34.16945>
- Tickle, L. (2000). *Teacher induction: The way ahead*. Open University Press.
- Vidović, V. V., & Domović, V. (2019). Development of teachers' beliefs as a core component of their professional identity in initial teacher education: A longitudinal perspective. *Center for Educational Policy Studies Journal*, 9(2), 119–138. <https://doi.org/10.26529/cepsj.720>
- Virtue, E. E., & Hinnant-Crawford, B. N. (2019). "We're doing things that are meaningful": Student perspectives of project-based learning across the disciplines. *The Interdisciplinary Journal of Problem-Based Learning*, 13(2). <https://doi.org/https://doi.org/10.7771/1541-5015.1809>
- Vonk, J. H. (1995). Conceptualizing novice teachers' professional development: A base for supervisory interventions. *Annual Meeting of the American Educational Research Association*, April, San Francisco, 1–13. <https://eric.ed.gov/?id=ED390838>

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