Enhancing EFL Preservice Teacher Education Through Project-Based Learning: An Action-Research Approach

El aprendizaje basado en proyectos para la formación de futuros docentes de inglés: un enfoque desde la investigación-acción

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This action-research study examines the impact of a project-based learning intervention on a group of English-as-a-foreign-language preservice teachers at a Chilean private university. The study aimed to explore the participants' perceived development in two key areas: teaching knowledge and learning and innovation skills. Data were collected through pre- and post-questionnaires and semi-structured interviews. Findings indicate notable improvements in both teaching knowledge and participants' perceptions of it, as well as a strengthening of learning and innovation skills, with critical thinking emerging as the most salient enhancement. These results provide valuable insights for English language teaching programs and future research, highlighting the benefits of project-based learning as a pedagogical approach in teacher education.

Keywords: 21st-century skills, action research, English as a foreign language, preservice teachers, project-based learning

Este estudio de investigación-acción examinó el impacto de una intervención de aprendizaje basado en proyectos en un grupo de estudiantes de pedagogía en inglés como lengua extranjera de una universidad chilena. Se analizó el desarrollo percibido de los participantes en dos áreas clave: el conocimiento pedagógico y las habilidades de aprendizaje e innovación. Los datos se recopilaron mediante cuestionarios de pre- y postaplicación, así como entrevistas semiestructuradas. Los hallazgos indican mejoras significativas en el conocimiento pedagógico y en su percepción, así como en el fortalecimiento de habilidades de aprendizaje e innovación. El pensamiento crítico se destacó como la mejora más relevante. Se destacan los beneficios del aprendizaje basado en proyectos como enfoque pedagógico en la formación docente.

Palabras clave: aprendizaje basado en proyectos, habilidades del siglo XXI, inglés como lengua extranjera, investigación-acción, profesores en formación

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Introduction

Grounded in a constructivist paradigm, project-based learning (PBL) is an instructional approach in which learners actively engage in extended, inquiry-driven projects to construct knowledge. Through real-world problem-solving and collaboration, students develop both subject-specific knowledge and essential 21st-century skills (Capraro et al., 2013; Larmer et al., 2015). PBL is also distinguished by its multidisciplinary nature. Krauss and Boss (2013) explain that integrating elements from different subject areas enriches PBL, reflecting real-world situations in which problems are best addressed by drawing on knowledge and skills from multiple disciplines. These authors recommend designing projects that integrate multiple disciplines or providing learners with opportunities to engage in PBL across subject areas, fostering an interdisciplinary approach to problem-solving.

Given these characteristics, PBL has established itself as a valuable pedagogical approach across diverse educational contexts, ranging from primary and secondary education (Chiang & Lee, 2016; Fitria Hidayat et al., 2024; Kaldi et al., 2011; Prastawa et al., 2024) to higher education (Aldobekhi & Abahussain, 2024; Shi et al., 2024; Vega-Abarzúa & Pleguezuelos-Saavedra, 2022). In this latter context, particularly in teacher education programs, a growing body of research documents successful PBL experiences for teacher candidates (Akbulut & Öner, 2021; Alrajeh, 2021; Dag & Durdu, 2017; Kokotsaki et al., 2016; Tsybulsky & Muchnik-Rozanov, 2023; Tsybulsky et al., 2020; Wuttiphan & Klinhom, 2023). Researchers in these studies report not only increased knowledge but also enhancements in 21st-century skills, which are essential in teacher education. Shi et al. (2024) investigated PBL instruction and observed significant improvements in the English proficiency of a group of English majors compared with those taught using traditional methods. Additionally, these students exhibited higher levels of social interaction. Similarly, Wuttiphan and Klinhom (2023) identified notable improvements in preservice

teachers' communication skills and highlighted PBL as an effective approach for addressing real-world problems. In line with these findings, Dag and Durdu (2017) investigated PBL in the context of group work and collaboration, reporting that preservice teachers view group work as beneficial for improving their problem-solving and collaboration skills.

To address its benefits, theoretical and empirical perspectives emphasize the importance of properly implementing PBL. Larmer et al. (2015) assert that it is crucial to distinguish PBL from regular projects. The authors contend that PBL, and by extension, high-quality projects, are those that "develop knowledge, skills, and dispositions that serve [students] both in the moment and in the long term" (p. 91). Consequently, PBL is an intentional endeavor that requires careful planning and execution to create meaningful learning experiences. In this regard, Hovey and Ferguson (2014) highlight that, beyond understanding PBL and its theoretical foundations, practical experience in implementing the methodology is essential. Reinforcing this notion, Fitria Hidayat et al. (2024) found that, despite adherence to the procedural steps of PBL, the instructor's failure to monitor and provide adequate scaffolding resulted in weak project implementation. Similarly, Vega-Abarzúa and Pleguezuelos-Saavedra (2022) report limitations in implementing PBL for the first time, with participants noting that while the PBL experience had its benefits, the project could have been executed more concisely.

In Chile, empirical research on PBL remains limited. However, existing studies on its implementation in higher education have primarily examined its impact on academic achievement, skill development, and students' perceptions. For instance, Barrera Arcaya et al. (2022) analyzed the effectiveness of PBL among 56 engineering students and reported statistically significant improvements in academic performance. Similarly, Villanueva Morales et al. (2022) investigated PBL's role in fostering learning and innovation skills (i.e., collaboration, communication, creativity, and critical thinking) among

students transitioning to higher education. Their findings highlighted PBL as an effective pedagogical approach, particularly in enhancing critical thinking. Additionally, Vega-Abarzúa and Pleguezuelos-Saavedra (2022) explored PBL from an interdisciplinary perspective with graphic design students, noting a positive impact on participants' perceptions, particularly regarding innovation and collaboration.

Despite these promising findings, PBL remains largely unexplored in teacher education. This research gap is particularly relevant given Chilean teaching standards for English language teaching (ELT), which emphasize not only linguistic competence but also the integration of 21st-century skills (Ministerio de Educación [MINEDUC], 2021). Furthermore, integrating these skills into English language teaching education continues to pose challenges (Masadeh, 2021; Wang & Kokotsaki, 2018). Given this context, the present study explored the perceived impact of PBL on a group of English as a foreign language (EFL) preservice teachers within a teacher education program, offering valuable insights into how PBL may benefit their teaching preparation.

Method

Participants

The participants in this study were 10 preservice teachers (six women and four men) aged 21 to 24, in their fourth year of a five-year English teacher education program at a private university in Ñuble, Chile. Participants had completed one year of face-to-face instruction before transitioning to nearly two years of remote learning due to the COVID-19 pandemic. At the time of the study, participants had also completed two practicum experiences and were receiving their first exposure to the English Language Teaching Methodology (ELTM) module, where the intervention took place. Upon returning to in-person learning, they exhibited enthusiasm but also voiced concerns about

their teacher education due to the operational adjustments resulting from COVID-19.

Research Design

The instructor-researcher overseeing the study and the ELTM module was a TESOL professor with a decade of experience in diverse educational contexts. She had previously taught the ELTM module and had experience conducting action research and implementing PBL in higher education. In addition to the instructor-researcher, three collaborators contributed to the study, assisting with data collection and analysis.

In response to participants' concerns, the instructor-researcher implemented an action research approach in the ELTM module, using PBL as the primary instructional method. Creswell (2012) defines action research as "systematic procedures used by teachers (or other individuals in an educational setting) to gather quantitative and qualitative data to address improvements in their educational setting, their teaching, and the learning of their students" (p. 22). Thus, the instructor-researcher simultaneously engaged in both taking action and conducting research. Mills's (2011) action-research spiral served as the organizing model for the study, outlining the dynamic sequence of the following stages: identifying an area of focus, collecting data, analyzing data, and developing an action plan. Each of these steps is described in detail below.

Identifying an Area of Focus

Given the challenges posed by the lockdown period, the instructor-researcher anticipated that preservice teachers might need additional emotional and academic support upon returning to face-to-face classes. To assess this, the instructor-researcher documented their attitudes and behaviors. Observations during the initial weeks revealed a shorter attention span during lectures than in previous cohorts, along with lower attendance, punctuality, and motivation. The responses from preservice teachers were more favorable towards practical activities.

To better understand the situation, the instructor-researcher initiated spontaneous classroom discussions, during which participants expressed concerns about one of their standardized examinations: the Teaching Knowledge Test (TKT), Module 2 by Cambridge (https://bit.ly/4jMC53i). This external examination, as described on the Cambridge website, assesses candidates' proficiency in lesson planning and the use of language teaching resources. Furthermore, preservice teachers expressed concerns about their communication and critical thinking skills, attributing their difficulties to limited participation and interaction with peers during remote classes. With a potential focus for the study identified, the instructor-researcher sought to gather more concrete evidence to establish formal parameters for the study.

Data Collection

As illustrated in Mills's (2011) action-research spiral, this form of inquiry follows a cyclical process rather than a linear trajectory, enabling researchers to refine their understanding through multiple iterations. Therefore, data collection is a fundamental component of action research, which relies on a systematic approach to gathering information to reflect on and improve educational practices or experiences within a specific context (Burns, 2009). Accordingly, data collection in this study occurred in three distinct stages using a mixed-methods approach. In the initial stage, data collection served an exploratory and diagnostic purpose, establishing the foundation for the study and providing insight into the problem. The next stage of data collection involved a more in-depth and formal exploration of the identified issues, utilizing quantitative data collection methods. To achieve this, the instructor-researcher designed a questionnaire aimed at establishing baseline parameters before the intervention. The questionnaire consisted of three sections. The first section focused on preservice teachers' current teaching knowledge. For this, a standardized test derived from Cambridge TKT, Module 2, was used, featuring closed-ended questions. The

second section aimed to capture preservice teachers' perceptions of their teaching knowledge. To assess this, the instructor-researcher formulated six statements on key aspects of teaching, derived from the TKT content (see Appendix A). The statements were presented on a Likert scale ranging from *strongly agree* to *strongly disagree*. The third section of the questionnaire assessed participants' self-perceived learning and innovation skills, also using a Likert scale. The statements in this section were developed based on a documentary review of the 21st-century skills for teacher education outlined by MINEDUC (2021).

The third stage of data collection employed both quantitative and qualitative methods and was conducted after the PBL intervention. Participants completed the same three-section questionnaire administered before the intervention, along with individual semi-structured interviews (see Appendix B).

It is important to emphasize that participants were fully informed about the intervention, data collection procedures, and the purpose of the study, all of which adhered to the ethical guidelines of the research site. As a result, participants provided informed consent before participating in the study. Additionally, the research instruments were revised by a panel of four academics, and the study received approval from the institution's ethics committee.

Data Analysis

Quantitative data were analyzed using the Shapiro-Wilk test to assess normality. To compare pre- and post-test scores, a paired *t*-test was conducted, and the confidence intervals for the difference in means were calculated. In addition, the percentage change relative to the maximum score for each variable was calculated. All analyses were performed using RStudio software (Version 2023.9.1) with a confidence level of 0.05.

Qualitative data, obtained through semi-structured interviews, were transcribed verbatim and analyzed thematically using Atlas.ti.

Developing an Action Plan: PBL Intervention

The action plan was implemented over a three-month period in the ELTM module, using PBL as the instructional method. This shift transformed the traditional ELTM module approach, leading participants to take on a more active role in their learning. Consequently, the course content, study materials, and assessments were adjusted to align with the project. To ensure the effective implementation of PBL, the study adopted the four-phase framework *Path to Project-Based Learning* proposed by the Buck Institute for Education (https://my.pblworks.org/). In the first phase, the PBL framework addresses the project launch and the formulation of the driving question that guides student inquiry. The second phase focuses on building knowledge and developing the skills required to respond to that question. The third phase centers on critiquing and refining the products as students evaluate their progress toward answering the driving question. Finally, the fourth phase involves presenting the completed products and articulating the answers derived from the inquiry process.

From this perspective, the project was initiated under the title *Pre-service Teachers' Conference on EFL Education.* In collaboration with the instructor-researcher, the preservice teachers formulated the driving question: How might we prepare for the preservice teachers' conference on topics relevant to teaching EFL in a Chilean school context? Guided by this inquiry, the preservice teachers proceeded to build the necessary knowledge and skills to address the driving question. To facilitate knowledge-building, participants suggested working in four groups, a decision that enabled them to collaboratively explore key ELT topics. To ensure the effective implementation of collaborative group work, the instructor-researcher, drawing on prior experience (Vega-Abarzúa et al., 2022), guided preservice teachers in assigning specific roles within their groups (e.g., organizer, summarizer, assistant). Given that the conference focused on ELT in Chilean schools, all groups agreed to ground their work in the English–Chilean Curriculum and coursebook materials, particularly *The Principles of Language Teaching* by Harmer (2015). From this point onward, each group, under the guidance of the instructor-researcher, explored various instructional strategies to study and prepare for key topics in English language teaching within Chilean school contexts. These strategies included group discussions, graphic organizers, debates, poster creation, video recordings, and research-based activities.

In the second phase of the intervention, the instructor-researcher provided scaffolding to support participants' engagement with the project. This support included the provision of essential materials (e.g., readings, guidelines, and example lesson plans), student-centered learning experiences, and connections between course materials and practical application. Additionally, the instructor-researcher guided participants to engage in peer collaboration, brainstorming sessions, and reflective practices to foster critical thinking and problem-solving skills. These strategies were directly linked to the PBL framework and designed to encourage independent learning and collaborative work. Once preservice teachers had gathered sufficient knowledge on ELT, they progressed to the third phase, in which they presented their findings to other groups, exchanged study strategies, and engaged in peer feedback. This process involved teaching reflections, case study analysis, and short simulations in which preservice teachers practiced communicating key teaching concepts and responding to questions, mirroring the dynamics of the upcoming conference. These activities were structured and guided by the instructor-researcher to equip preservice teachers with the necessary skills and encouragement to navigate the challenges of public speaking, particularly in responding to audience inquiries during the conference. This process also allowed participants to revisit their study materials and strategies, reinforcing their understanding and refining their approach to the topics they would present.

The final phase culminated in the conference, where preservice teachers presented to an audience of academics and peers. This event simulated a professional setting, allowing participants to apply their knowledge, practice public speaking, and engage in discussions on ELT in Chilean schools. Upon arriving at the conference, the audience submitted questions on the topic, which were then collected and randomly selected to initiate the discussion. During the conference, participants took turns answering the selected questions and engaged in further interaction with the audience. Additionally, participants shared study strategies and insights into their preparation process for the event.

Results

### Quantitative Data

Teaching Knowledge Test

The results indicate statistically significant differences in the TKT scores before and after the PBL intervention (see Table 1 and Figure 1). Specifically, there was a notable average increase of 8.9 points ($p < 0.05$), with a 95% CI [4.628, 13.172]. This represents an 11.1% increase relative to the maximum score.

Table 1. Teaching Knowledge Test (TKT) Paired *t*-test Scores

	Mean	SD	Mean 95% CI		Percentage of change	P-value
			Lower	Upper		
TKT pre-test	53.2	10.1	45.977	60.423	-	-
TKT post-test	62.1	8.4	56.120	68.080	-	-
TKT difference (post/ pre-tests)	8.9↑	6.0	4.628	13.172	11.1↑	0.0010*

* $p < 0.05$

Figure 1. Teaching Knowledge Test Before and After the Intervention
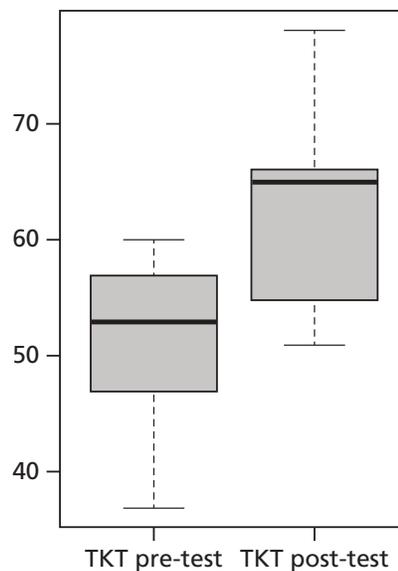
Perceived Teaching Knowledge

Preservice teachers' responses indicated a statistically significant difference in their perceived teaching knowledge before and after the PBL intervention (see Table 2 and Figure 2). Specifically, an average increase of 3 points ($p < 0.05$) was observed, with a 95% CI [1.738, 4.262] in the pre- and post-intervention assessments, representing a 10% increase relative to the maximum score.

Table 2. Perceived Teaching Knowledge (TK) Paired *t*-test Scores

	Mean	SD	Mean 95% CI		Percentage of change	P-value
			Lower	Upper		
Perceived TK pre-test	16.8	1.7	15.547	18.053	-	-
Perceived TK post-test	19.8	1.5	18.692	20.908	-	-
Perceived TK difference (post/pre-tests)	3.0↑	1.8	1.783	4.262	10↑	0.0004*

* $p < 0.05$

Figure 2. Preservice Teachers' Teaching Knowledge Self-Perceptions Before and After the Intervention
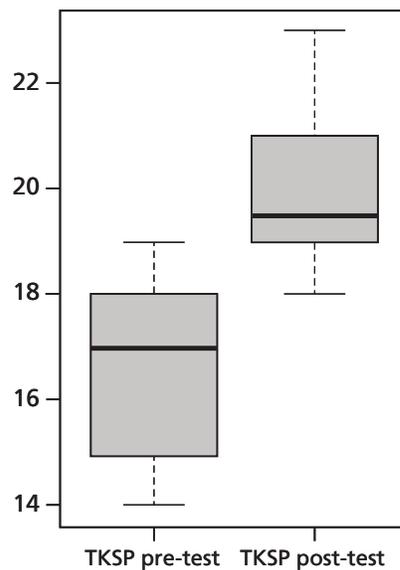
Learning and Innovation Skills

Results in the dimension of preservice teachers' self-perceptions of learning and innovation skills do not indicate statistically significant differences. The average change was 0.5 points ($p > 0.05$), with a 95% CI [-1.692, 2.692] between the pre- and post-tests, representing a 2.5% increase relative to the maximum score, as shown in Table 3 and Figure 3.

Table 3. Learning and Innovation Skills Paired *t*-test Scores

	Mean	SD	Mean 95% CI		Percentage of change	P-value
			Lower	Upper		
Learning and innovation skills pre-test	15.0	3.0	12.867	17.133	-	-
Learning and innovation skills post-test	15.5	2.1	14.020	16.979	-	-
Learning and innovation skills difference (post/pre-tests)	0.5↑	3.1	-1.692	2.692	2.5↑	0.6180*

* $p < 0.05$

Figure 3. Self-Perceptions on Learning and Innovation Skills Before and After the Intervention
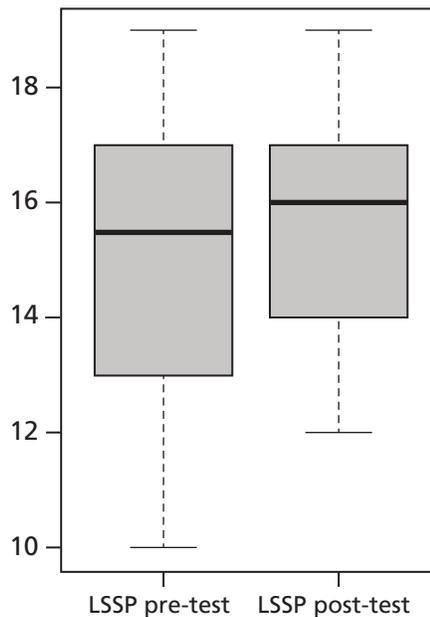
Findings From Qualitative Data

Overall, the findings from the qualitative data align with the quantitative evidence. The qualitative analysis provided deeper insights into the impact of the PBL intervention by capturing participants' perceptions in greater detail. To explore these nuances, the results were organized into tables and presented by dimension.

Teaching Knowledge

In the teaching knowledge dimension, three main categories emerged: *lesson planning*, *instructional resources*, and *teaching awareness*. In particular, the lesson planning category was distinguished by the identification of two specific themes. The first and most recurrent theme was connected to increased *confidence in lesson planning*:

> I know each section of a lesson plan and how to complete it. I no longer doubt, as I know what each stage requires. (Participant 9)
>
> I had an idea on how to plan a lesson, but now I understand the whole process of planning and the role of the lesson stages. (Participant 5)
>
> [PBL] could not have been any better for learning the basics and details about lesson planning. (Participant 1)

Participants also reflected on their previous planning experiences, describing them as mechanical. In contrast, following the PBL intervention, they expressed a stronger sense of readiness for planning and sequencing lessons, leading to the theme of *efficacy*: "With this methodology, and compared to the structured planning I had studied before, I learned how to plan for the students of today and contextualize what I teach" (Participant 3).

In the *instructional resources* category, most participants reported increased confidence and precision in selecting and utilizing teaching materials, which led to the emergence of a *selection confidence* theme:

> I feel more prepared because we could study a number of teaching resources. I didn't even know that they could be useful and implemented in the assessment! (Participant 4)

Now my lessons can be more didactic and dynamic as I can use different types of aids or resources. (Participant 9) Now I know that I can use realia, authentic materials, and other [teaching] aids because I know them and where to get them. (Participant 10)

Another identified theme in the *instructional resources* category was *precision and importance*. We believe that the variety of instructional resources used during the PBL intervention expanded participants' understanding of teaching and provided multiple options to enrich their practices. Some participants underscored the significance of instructional resources, emphasizing their benefits, impact on learners, and the rationale behind their use:

> It is easier now as I know how to [correctly] use [instructional resources]. (Participant 2)
>
> I feel better. Before I used to [select instructional resources] without any reasons. Now I select what can impact my students in a better way. (Participant 3)

In terms of the *teaching awareness* category, some participants recognized the importance of diversifying instructional approaches to meet the various needs of their future students. They highlighted the value of fostering essential skills, moving beyond traditional teaching methods, and implementing active learning strategies to create more effective and inclusive learning environments.

> With this experience, I understood that traditional learning will not benefit my students because we will have different students in the classroom who will need different kinds of support, so it is very important to learn how to implement different active methods to use them in an effective way in the classroom. (Participant 5)
>
> I learnt how to strengthen different skills . . . this might help me develop important skills in my future students and find strategies to help students develop their skills because they are very useful . . . I had not learnt them until now! (Participant 2)

The project helped me understand what can occur in the classroom beyond traditional activities . . . I know that there are different activities and strategies that we can use. (Participant 7)

Learning and Innovation Skills

The learning skills dimension indicated that, although statistical analysis did not show significant changes, the PBL intervention had a positive impact on participants' overall learning skills. Participants reported notable improvements in their learning skills following the intervention. Critical thinking emerged as one of the most prominent skills, highlighted by most participants. They emphasized that, throughout the project, they were required to reflect extensively on various aspects of ELT, the English curriculum, and diverse educational contexts. According to the participants, this continuous reflection, paired with the motivation to become ELT experts for the conference, fostered a new perspective on teaching:

> [The project] was something different . . . we were expected to be experts in the conference, so we learnt many things, shared those things and communicated our viewpoints . . . and that is how my classmates and I developed our critical thinking. (Participant 2)
> Critical thinking [was the most developed skill] since we had to constantly question what we were learning and thus be able to provide ideas for the driving question. (Participant 8)

Collaboration emerged as a key theme following critical thinking. Participants indicated that working in groups toward a shared goal over an extended period significantly enhanced their collaboration:

> I believe that collaboration was the most consolidated skill . . . we worked in groups and then together until the conference day. (Participant 6)
> Collaboration, because all the other modules have an individualist approach, whereas . . . with the project, everything was planned to work in groups, and that is

very important for our final thesis project because it is in groups. (Participant 7)

Communication was the third most recurrent theme. Some participants described their improvements by contrasting them with their prior experiences:

> I think that speaking was an improvement area because before I was afraid of giving my opinion, especially in a language that I am still learning. (Participant 8)
> I think that critical thinking and communication skills were the skills that I could develop the most because we had to question everything, support, and communicate that. (Participant 8)

Creative thinking also featured prominently in the interviews. Many participants noted that the PBL intervention encouraged them to embrace variation and innovation, particularly when planning and designing learning experiences:

> Creativity as well, because when we had to create and adapt teaching materials, and when we created the posters, we had to think out of the box. (Participant 1)
> Creative thinking [was the most salient area] because I used to incorporate the typical things. Now, I feel more prepared, specifically in being creative . . . finding the best aids to teach my lessons. (Participant 3)

PBL and Future Teaching Practice

The interviews also provided insight into the impact of PBL on the participants' future teaching practices. Most participants stated that the PBL intervention had served as a source of inspiration for their EFL classrooms. They highlighted that, throughout the project, they engaged with diverse teaching strategies and experienced non-traditional forms of learning:

> I believe that what [the instructor-researcher] planned was new to me . . . I had never seen it before . . . sitting in circles, engaging in deep discussion with our classmates, teaching in different ways . . . this has completely changed how teaching can be like. (Participant 2)

We no longer see the classroom as a traditional setting; instead, we are always looking for ways to diversify learning. (Participant 5)

Additionally, participants expressed a greater understanding of how to implement collaborative learning in their future classrooms. They highlighted the importance of group work and its role in fostering student collaboration, emphasizing that the project provided them with practical ideas for their teaching practice:

This experience has given me some ideas on how to implement group-work activities and thus foster collaboration in the classroom. (Participant 7)

The activities of the project and group work are some of the key things that will be crucial for my practicum and future teaching experience. (Participant 9)

Lastly, participants' answers revealed a strong intention to incorporate PBL into their future teaching practices, recognizing its potential to engage students actively. They emphasized the importance of making learners the protagonists of their own learning and highlighted PBL as an effective methodology for fostering motivation and participation in the classroom.

I want to engage [future learners] . . . I want to make them feel the protagonists of their own learning. (Participant 4)

I definitely plan to incorporate [PBL] because it is an effective methodology that engages students. (Participant 6).

Now I know how to teach English lessons in which learners can be motivated and participative. (Participant 9)

PBL Highlights and Challenges

In the interviews, participants were asked to reflect on the most enriching activities experienced during the intervention, as well as the challenges they encountered throughout the four phases of the project (see Table 4). In response, all participants identified the final activity (the conference) as the most significant moment of the entire project:

I think the conference had the biggest impact on me because I had never done anything like that before. For example, I had recorded videos before, both in high school and here at university. But the conference was something completely new for me . . . it was about teaching and demonstrating the knowledge I had gained throughout the semester. (Participant 2)

The conference, definitely! It was the final stage and in front of other people, so we could not spoil things . . . it was the most important thing and the most difficult one because it was hard work preparing for it . . . and I think that it helped me flourish as a teacher. (Participant 10)

Additionally, some participants highlighted the student-centered nature of the project, which integrated innovative teaching strategies:

I think that the creation of posters was fun as we had to get to an agreement with my classmates about what information we wanted to include . . . and sometimes we disagreed on the ideas, but it was meaningful for me. (Participant 3)

One of the activities that helped me was the video; it helped me a lot with the different approaches to teaching English. I had no prior knowledge of the different methodologies, and having to create a video using these approaches was incredibly meaningful—it allowed me to understand them better and apply them. (Participant 5)

Case study assessments were also highlighted by participants as valuable tools for improving lesson planning and deepening their understanding of the characteristics of various educational settings:

I remember two activities that I enjoyed the most . . . I liked when we had to solve school problems using the curriculum to provide a solution . . . it was like solving mystery cases . . . this helped me learn a lot. (Participant 1)

Reflecting on school situations and learning about teaching approaches in a fun way helped me improve

my lesson planning because, before, I was confused about the lesson stages. Now I know that things can be more flexible…I can take one activity and include it at a different stage or replace it with something else. (Participant 5)

Another element participants identified as particularly nurturing was the scaffolding provided during the activities of the project, as they felt they needed additional guidance supporting their ideas:

> I think that guiding us to evaluate information to provide a solid answer in terms of planning and using resources in the classroom helped me a lot. It was the most difficult part for me because I used to feel insecure about my answers. I learnt how to support my ideas and where to find the information, for example, in the national curriculum . . . to provide solutions. (Participant 1)
>
> I think that every single activity helped me in different ways . . . I was pushed to use arguments so that I felt that studying and knowing what to say helped me a lot. (Participant 4)

Lastly, participants emphasized the importance of feedback, noting that it was crucial not only for making progress in the project but also for boosting their self-confidence:

> In groups and with [the instructor-researcher], we worked a lot on our self-confidence . . . in what we can actually do and in our teaching potential as well. (Participant 6)
>
> The whole experience helped me a lot. I struggled with speaking, but the activities and [the instructor-researcher's] support helped me feel more confident about my ideas and what I say . . . now I can see things from various perspectives and with more clarity, as I can provide reasons to support what I say. (Participant 9)

Table 4. Summary of the Intervention's Highlights and Challenges

Highlights	Challenges
Conference	Anxiety
Student-centered strategies	Insecurity
Non-traditional assessment	Group work
Scaffolding	Time management
Feedback	

In terms of challenges faced during the PBL intervention, participants explained that, rather than specific phases being particularly difficult, the obstacles they encountered were primarily personal. Most expressed anxiety to transition from traditional learning methods to an entirely new approach they had not experienced before: "I think that the challenges were mainly connected to my anxiety . . . and having to deal with something new was challenging at first" (Participant 1). "The most difficult part was facing something new . . . we didn't know what the PBL intervention would imply" (Participant 3).

Furthermore, participants reported high levels of insecurity, particularly regarding expressing their ideas clearly and presenting them in front of others:

> At first, when [the instructor-researcher] suggested working using PBL, I felt very insecure to the point of [worrying about failing] the module . . . but then everything changed. I felt so comfortable . . . the environment was welcoming, free to express ourselves, and make contributions with our ideas. (Participant 5)
>
> The fact that the final activity would be a conference was challenging for me because I did not know the people who would attend. (Participant 6)

Some participants also felt apprehensive about collaborative work as they had to work in teams throughout the entire project, but their perspectives shifted once roles were assigned within the groups:

> Working in groups! That was my main challenge as I used to work by myself and I knew I did well like that . . . but working for the conference required group work . . . and I worked with my classmates, and I learnt what collaboration is. (Participant 2)
>
> One of the major challenges was working in groups for the whole module, as everybody has a different personality. However, things turned out to be very different as we worked well together, being able to adjust to one another. (Participant 8)

Additionally, participants mentioned challenges in organizing their schedules for study after instruction, as not everyone lived near campus or took the same classes:

> Even though the project was conducted through the semester, the most difficult part was organizing ourselves to study…everybody had different schedules and lives at a different location…some of us far from the university, so sometimes we met [online]. (Participant 5)

Discussion

We found that the PBL intervention positively impacted EFL preservice teachers. Using a mixed-methods approach, we determined that the preservice teachers' teaching knowledge and perceptions of it improved significantly. These findings are consistent with previous studies that highlight a positive impact of PBL on preservice teachers (Dag & Durdu, 2017; Goldstein, 2016; Tsybulsky et al., 2020; Wuttiphan & Klinhom, 2023).

From a teaching knowledge standpoint, we observed notable improvements following the PBL intervention. Participants reported increased confidence and efficacy in lesson planning, along with a heightened teaching awareness. The findings in this dimension led us to conclude that the PBL intervention helped preservice teachers become more connected to their future practice and their identities as future educators, and to reflect deeply on the impact of their pedagogy in the classroom. Furthermore, participants reported feeling more self-confident about their actions and decisions in the classroom. These findings align with the study by Tsybulsky and Muchnik-Rozanov (2023), which found increased connection to teaching and higher self-confidence in preservice teachers' teaching abilities after engaging in PBL. Additionally, our participants concluded that the PBL intervention had shifted their teaching paradigms, enabling them to discover new ways of teaching and gain insight into the implications of student-centered learning. These findings are particularly relevant for teacher education programs, as exposing preservice teachers to constructivist approaches is essential for nurturing their future teaching practices (Alrajeh, 2021; MINEDUC, 2021; Tsybulsky et al., 2020).

In terms of learning and innovation skills, participants acknowledged improvements in their critical thinking, collaboration, communication, and creativity after the intervention. Although the quantitative data did not reveal statistically significant changes between pre- and post-tests, qualitative data strongly support improvements in these skills. This finding is consistent with the principles of PBL, which emphasize the development of 21st-century skills, as supported both theoretically (Krauss & Boss, 2013; Larmer et al., 2015) and empirically (Chiang & Lee, 2016; Krajcik & Shin, 2014; Tsybulsky et al., 2020; Vega-Abarzúa & Plegu-ezuelos-Saavedra, 2022). Among these skills, critical thinking, as captured in the qualitative data collection stage, was the most frequently mentioned area of improvement. In our study, participants reported that PBL, along with the strategies and activities employed in the ELTM module, fostered critical thinking at both personal and professional levels. This perspective is consistent with other studies (Puangpunsi, 2021; Rochmahwati, 2015; Villanueva Morales et al., 2022) that have reported improvements in learners' critical thinking skills through a project-based approach. This finding is particularly noteworthy, as skills, including critical and creative thinking, are often challenging to integrate into English language teaching and learning (Masadeh, 2021; Wang & Kokotsaki, 2018).

Findings also highlight the impact of PBL on participants' future teaching practices. Results from the qualitative stage suggest that PBL not only encourages preservice teachers to implement this methodology but also inspires a broader shift toward student-centered approaches that foster diverse skill development. Our findings also suggest that PBL in EFL teacher education can provide a valuable opportunity to enhance preservice teachers' ability to implement project-based pedagogy effectively. This underscores the importance of rich learning opportunities and meaningful learning in teacher preparation, as emphasized by Kavanagh and Rainey (2017).

It is worth noting that participants highlighted the significance of the final phase of the project (the conference) because it provided a holistic approach to learning and the development of 21st-century skills. This finding aligns with the principles of PBL, as it is intended to cultivate academic and life skills, a theme that has been widely supported by empirical research (Alrajeh, 2021; Tsybulsky et al., 2020; Wuttiphan & Klinhom, 2023). Participants also emphasized the value of ongoing feedback, scaffolding, and the opportunity to construct their own learning, which aligns with Dewey's (1916) constructivist perspective of learning through experience.

Finally, it is important to highlight that the participants in our PBL intervention experienced anxiety and insecurity during the initial phase of the project, primarily due to their apprehension about change. This phenomenon has been documented in previous research (Tsybulsky et al., 2020). These findings suggest the need for a more structured integration of PBL within teacher education programs. Specifically, incorporating PBL interventions consistently within a single course or across multiple modules could familiarize preservice teachers with the methodology in advance, potentially reducing anxiety and enhancing their overall learning experience. Additionally, participants recognized the importance of effective time management in the prepara-

tion and execution of the project, suggesting that projects should be conducted throughout the term. While in our study some participants felt that extended sessions were necessary for meaningful engagement, others, as seen in Vega-Abarzúa and Pleguezuelo-Saavedra's (2022), believed the project could have been executed in shorter time frames. This divergence highlights the need for a more flexible approach to scheduling PBL interventions. Future research could explore how different time allocations impact learning outcomes, engagement, and overall effectiveness.

Conclusion

Reflecting on our PBL intervention, we did not encounter major limitations, as participants overcame their initial concerns and ultimately embraced the project. However, a key consideration for future studies is the time-intensive nature of PBL. Preparing each lesson, designing student-centered learning experiences, providing continuous feedback and support, and implementing effective scaffolding required a significant time investment. Additionally, in this case, the instructor-researcher launched the project independently, further increasing the workload. Future initiatives should take these demands into account to ensure sustainable implementation.

It is also worth mentioning that the action-research design of this study required multiple methods of data collection across different stages. Managing qualitative and quantitative data simultaneously demanded careful planning and execution to ensure coherence and reliability. Despite these challenges, the mixed-methods approach provided a more comprehensive understanding of participants' experiences and the overall impact of the PBL intervention.

Finally, it is hoped that this study serves as a valuable reference for future researchers and teacher education programs, as the findings strongly support PBL as a constructive pedagogy that can enhance the educational experience of EFL preservice teachers.

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Appendix A: Questionnaire on Perceptions of Teaching Knowledge

Section II: Perceived teaching knowledge

Please rate your level of agreement with the following statements based on your current teaching knowledge. Choose one option only.

	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	I have a strong understanding of language teaching methodologies and how to apply them in the classroom					
2.	I can effectively design lesson plans that align with learning objectives and students' needs					
3.	I am confident in my ability to assess learners' progress using a variety of assessment tools and techniques					
4.	I understand how to provide clear and meaningful instructions to students at different proficiency levels					
5.	I am knowledgeable about classroom management strategies that foster student engagement and participation					
6.	I can adapt my teaching strategies to accommodate diverse learning styles and needs					

Section III: Learning and innovation skills self-perceptions

Please rate your level of agreement with the following statements based on your current skills. Choose one option statement only.

	Statement	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	I can express my ideas clearly and effectively in both spoken and written English within academic and teaching contexts					
2.	I actively listen and respond appropriately to others in discussions and classroom interactions					
3.	I can analyze classroom challenges and develop effective solutions based on evidence and reasoning					
4.	I am able to evaluate different teaching strategies and select the most appropriate for specific learning situations					
5.	I work well in teams, respecting diverse perspectives and contributing meaningfully to group tasks					
6.	I can provide and receive constructive feedback to improve collaborative work and teaching practices					
7.	I am comfortable adapting my teaching strategies to meet the needs of diverse learners					
8.	I can generate innovative ideas and activities that enhance student engagement and learning					

Appendix B: Semi-Structured Interview

1. In what ways has PBL contributed to consolidating your teaching knowledge? Can you provide specific examples?

2. How do you feel about planning your English lesson? Did the PBL intervention influence the way you plan your lessons?

3. How do you approach selecting resources and materials for your future students? Did the PBL intervention influence the way you make these choices?

4. Do you feel that your learning and innovation skills (e.g., communication, collaboration, critical thinking, creative thinking) have improved through this experience? Which specific skills do you think have been strengthened?

5. In what ways has the PBL intervention influenced your future teaching practices?

6. What aspects of the PBL experience would you highlight, and what did you find most challenging?