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Learning beyond boundaries: Maximizing project-based learning implementation at the tertiary level

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Abstract

In the digital age, education has become increasingly oriented toward economic relevance, multimedia integration, and skill development. The demands of twenty-first-century learning necessitate pedagogies that prepare students for authentic, real-world contexts, with Project-Based Learning (PBL) emerging as a promising approach. This study employed a reflective descriptive qualitative method to examine the integration of PBL among forty-six master's students within a university setting. Data was collected through daily journals, participant observation, and reflective accounts. The investigation involved three participant groups: the supervising researcher, students engaged in PBL activities, and mentors who guided the implementation and evaluation of lesson delivery. Analysis focused on the conceptualization, application, and multi-dimensional aspects of PBL execution. Findings revealed a structured four-part framework that supports the recalibration of instruction to enhance learning outcomes. The study underscores the value of PBL as a transformative educational practice that fosters reflection, collaboration, and practical skill acquisition in higher education contexts.

Keywords: Educational innovation; higher education; project-based learning; reflective practice; skill development.

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1. INTRODUCTION

The context in which we live is constantly changing and evolving, and so must the type of education we impart to our learners (Radu, 2019). This is crucial not only for them to survive in this tech-oriented, economy-focused, and skill-driven environment but also to thrive in it (Kutrzeba, 2018). Project-based learning (PBL) brings valuable contributions by making education less abstract and more grounded in real-world experiences (Santana & de Deus Lopes, 2024; Haddou et al., 2025). This approach offers students numerous opportunities to develop a broad range of skills essential for future professional success (Crespí et al., 2022), ranging from problem-solving (Boelt et al., 2022), digital literacy (Bell, 2010), critical thinking (Carvalho, 2016), decision-making (Barros & Bittencourt, 2018), leadership (Deep et al., 2020), to time management and collaboration (Wurdinger & Qureshi, 2015). Proper implementation of this innovative method of instruction is key to maximizing the teaching and learning process (McParland et al., 2004), which can significantly enhance academic achievement (Batdı, 2014; Jiménez-Saiz & Rosace, 2019) and foster the externalization of knowledge (Nuutila et al., 2005).

Because of PBL's holistic learning, different studies have been conducted globally (Aboulfotoh 2020; Chen, 2019; Kimsesiz et al., 2017; Ngadiso et al., 2021) and locally (Aimeur, 2011; Baghoussi & Zoubida, 2019; Bouhlassa, 2020) in English as a Foreign Language (EFL) arena at different levels and particularly at tertiary level (El Moudden & Lamkhanter 2024; Mariscal Touzard et al., 2023; Samarji & Sabbah 2024; Zhao et al., 2023) as it possesses the potential to develop 21st-century skills necessary for students' future professional career. However, developing all these skills cannot be accomplished without proper implementation of the PBL where different challenges arise including time constraints for completing the project (Holm, 2011), the complexity of assessment, as it requires formative and summative evaluation of the multifarious skills students work on (Van Der Vleuten & Schuwirth, 2019), group dynamics, which can considerably impact the PBL learning process (Lee, 2025), access to tech-based resources and the extent of their integration into the learning journey (ChanLin, 2008), and maintaining student motivation and engagement throughout the PBL project (Blumenfeld et al., 1991; Chimwayange, 2025).

From an anchor-focused standpoint, because of the above-mentioned benefits that PBL can yield, it was employed as an innovative instructional model that can potentially refine and enhance Abdelhamid Ibn Badis University's Master II students' 21st-century skillsets, enabling them to perform effectively in their future professional careers. In fact, the integration and execution process of a PBL project is as important as its outcome. This is why this study aims to investigate and reflect upon the implementation of PBL, along with tracing the step-by-step procedure used to bring this project into fruition. Though different studies mapped out the evolution of the PBL (Song et al., 2024) along with identifying its merits and challenges (Aksela & Haatainen, 2019; Clyne & Billiar, 2016; Hidayah et al., 2021), few studies have proposed a framework for fully maximizing the PBL learning process, and even fewer in the Algerian context. In this regard, this scholarship would significantly enrich the existing literature in the ever-evolving PBL landscape.

1.1. Literature review

1.1.1. Project-based learning

Project-based learning is commonly seen as a substitute for conventional, instructor-centered education (Maros et al., 2023). This mode of teaching has many features and aspects that characterize real benefits for the educational community overall. Kalabzová (2015) attests that the PBL approach is covering more ground because of two main reasons. First, technological advancement has provided a mass of information available online that has created a favorable environment for a broader PBL implementation (Mabe et al., 2022). This abundant amount of information assists learners to operate independently inside and outside the bounds of educational institutions while navigating cross-disciplinary contexts (Akhmetsapa et al., 2024). Second, the PBL instructional approach has the potential to substantially enhance key skills in different layers, notably academic, professional, and social (Jezberová et al., 2011). Scarbrough (2003) describes PBL as "a performative orientation toward learning ... that

increases flexibility by capturing the learning generated in project work and transferring it to others" (p. 3). Importantly, the pragmatic and collaborative aspect of the PBL process can return a favorable outcome (Kokotsaki et al., 2016). Thus, one can take the best quality product and attempt to capture and then reproduce this in other settings so as to obtain similar results. This situation is called "learning transfer" (Cohen & Levinthal, 1990). It can be a very useful strategy that not only provides the opportunity to learn from past achievements but also to avoid any missteps that might have been previously encountered. As such, Buck Institute of Education (2013) portrays PBL's effectiveness by arguing that: Rigorous projects are carefully planned, managed, and assessed to help students learn key academic content, practice 21st-century skills such as collaboration, communication, and critical thinking, and create high-quality, authentic products and presentations (p. 1). Clearly, PBL projects are thoroughly devised, directed, and evaluated, where each step needs careful consideration on the part of both the learner and the teacher. Frequently, teachers need to be trained or upgraded in disseminating knowledge through PBL through Interactive mediums (Uzunboylu et al., 2025). Moreover, it promotes numerous skills that are needed in the new era. PBL projects intend to give students an essence of future work through deep involvement in a genuine expert setting, which puts students in realistic and authentic situations where they will meet specialists in the targeted area (Meehan & Thomas, 2006). This grants students learning opportunities that can be substantially profitable and beneficial for them. In this light, Blumenfeld et al. (1991) provide an exhaustive description of PBL while probing its main features, demonstrating that:

> *Project-based learning is a comprehensive perspective focused on teaching by engaging students in investigation… so students pursue solutions to nontrivial problems by asking and refining questions, debating ideas, making predictions, designing plans and/or experiments, collecting and analyzing data, drawing conclusions, communicating their ideas and findings to others, asking new questions, and creating artifacts* (p .371).

This encompassing delineation shows the different steps students go through in the PBL application and what skills they will enhance and improve. The initial step is to identify a problem that is of interest to students by asking the right questions and then delving into an in-depth inquiry process to search, analyze, synthesize, and select the data to be explored. Subsequently, students dive into the design of their product so that they can present it to a real audience. When students operate in such an immersive environment, the artifacts produced through a PBL task manifest that students have improved their practice and reflection (Boss, 2014). Bell et al. (2010) introduce the concept of "accountability" because when students work on a project, there is an expectation that everyone will present a share of the global product. What's more, she claims that "peer pressure contributes to the accomplishment of ongoing group tasks throughout the learning process and the culmination of a successful final product", which significantly enhances the work spirit within the members and consequently elevates the level of motivation to work even harder so as not to disappoint their friends' expectations. Finally, Bell et al. (2010) put forth that the merits of PBL are an in-depth understanding of the content, intense learning, high-level reading, and heightened motivation to learn, which is what any student requires to be proficient in his/her field of study, notwithstanding the extrinsic level of motivation they will experience.

1.1.2. PBL roadblocks and resolutions

Like any instructional model, PBL has some challenging elements that teachers can encounter. In this regard, Kehoe et al. (19987) identify three potential problems that teachers might get entangled in:

1. The team management can be troublesome for students to handle, because they may lack coordination skills. This situation might be confronted mainly by students who are still accustomed to traditional models of learning and, therefore, have little knowledge of how to behave in the modern one, where collaborative work is a core practice.

2. Lack of reflection occurs when students are so absorbed in finishing the product that they do not reflect upon their learning and actually learn. This state of mind can impede students from viewing the bigger picture of the PBL instruction method, where students learn from every step of the project.

3. Linking theory to practice, in the sense that students encounter difficulties in applying the content knowledge in real situations. It is a transitional step that all students go through as they dig into the practical aspects, and a link needs to be made from the theoretical notions to the real aspects of the content.

Tamim and Grant (2013) identify a fourth challenge, debating that there has to be a "degree of balance needed between student control and teacher control over the activities" so instructors must "recognize and accept a shift in their function". In this respect, Ravitz (2003) attests that even when teachers are eager to apply PBL, they might find some difficulties in implementing it in their classrooms. It is quite common for teachers to hold on to their position in the traditional model when being novices in implementing the PBL paradigm. However, once the mentor sees how immersed their students are in their learning process by taking an active role in it, they will certainly be willing to turn to a student-driven approach. Studies carried out by Meehan and Thomas (2006) have shown that students undertaking an ecological management project in Vietnam reported group work as the most challenging part of the work. In fact, this aspect can consistently hinder the learning process as students do not have personal affinities with each other; thus, it becomes really difficult to operate in an unfriendly environment. That is why it is of utmost importance that students choose their team members so as to avoid any idiosyncratic future issues within one of the PBL groups.

1.1.3. Steps of PBL project implementation

Before launching a PBL project, a conceptual framework is to be devised that leads both the instructor and students to go through multiple steps (Geissler, 2014) involving: 1. identification of the content to be dealt with, the limitations that students may encounter, the scale of the project's scope and, more importantly, setting the main aims of the project; 2. deciding on the duration of the project as well as the deadline, and whether any flexible changes are to be made; 3. Planning the activities consists of preparing the framework students are to work on, which means students will know in advance what the outcome will be, but not the solution 4. Assessing students is an important element to consider as the instructor is to choose which methods students are to be assessed with, either formatively, summatively, or both. By doing so, they can measure the extent to which learners reach the targeted goals. The evaluation can take many forms, ranging from an ongoing test to rubrics and a quiz (Capraro & Slough, 2013).

From another perspective, Hung (2009) proposes the combination of 3C3R model (Hung, 2006), designed primarily to guide instructors in conceiving effective PBL problems and which has two classes of components, core component (Content which revolves around the knowledge and skills to learn, Context which is the real-world setting and Connection which deals with knowledge and skills integration) and processing components (reasoning, researching and reflecting), and the nine steps PBL problem design process in effectively implementing an effective and efficient PBL project in instructors' educational institutions. These steps include: 1. Set goals and objectives, 2. Conduct content/task analysis, 3. Analyze context specification, 4. Select/generate PBL problem, 5. Conduct PBL problem affordance analysis, 6. Conduct correspondence analysis, 7. Conduct calibration processes, 8. Construct a reflection component, and 9. Examine inter-supporting relationships of the 3C3R components. Their combination offers instructors guidelines on efficaciously implementing the PBL, and the more it is coupled with research findings, the greater the chances of developing this ever-growing PBL-driven pedagogical sphere (Hung, 2016).

1.1.4. Project-based learning features

PBL builds upon students' broad spectrum of skills and guides their learning through a well-defined problem and objective. But it is up to students to come up with a solution that they deem most suitable. Indeed, Boss (2014) identifies some PBL characteristics which are clearly displayed below:

Problem-driven, as students try to propose solutions to existing problems. The project must be centered around a well-defined problem so that students will make connections between the activities and the underlying knowledge that needs to be nurtured.

For the project to be brought to completion, a diligent investigation has to be carried out. It incorporates research discovery, design, decision-making, and product building. However, Bereiter and Scardamalia (1999) sustain the prominence of transforming and constructing by setting apart some simple tasks that can be accomplished with students' current background knowledge from a PBL project.

The students are the leaders of the project since they operate autonomously. They are responsible for the tasks they are undertaking. The process is almost entirely student-driven in that they take charge of their learning (Santharooban & Sathaananthan, 2014), which will lead to undetermined results that, in turn, are authentically marked by students' interest and contributions.

Projects are very practical and realistic (Vidoni et al., 2018). That is, students are to function in a realistic framework that includes multiple variables. These criteria can incorporate the theme, the assigned function, the context within which the project is to be carried out, as well as the partners and the audience for students.

The answer is not pre-defined, and the outcome can be produced in different ways, which means that there is more than one single correct response (Kokotsaki et al., 2016). Thomas (2000) focuses on the significance of the final product that is crafted by the learners. The outcome, be it a product or a performance, must be presented to an audience, which will prompt learners' motivation as they will have a social responsibility toward the community they are contributing to (Butler & Christofil, 2014).

This feature emphasizes the reflective aspect of learning (Lim, 2011), which entails students thinking and pondering upon their understanding. Additionally, the valuable feedback that can be used to improve the quality of their learning process can help adjust their product so as to obtain, in the end, a high-quality outcome (Munje, 2022).

The PBL project is about a set of tasks that are centered around instructing students in vital knowledge and capabilities, which in turn strengthen their understanding of key concepts related to a specific academic subject. This is what Smith (2015) highlights by mentioning that the teacher is responsible for "designing the project to ensure students are learning and progressing towards the identified standards and course objectives" (p. 2-3). So, the core of this instructional model is not just developing key skills but also ensuring the acquisition of content knowledge from a practical perspective. This will help engrave and retain these concepts longer (Vega, 2015).

1.2. Purpose of study

The purpose of this study was to examine how Project-Based Learning (PBL) is integrated into higher education settings and to explore its impact on instructional design and student learning. Specifically, it aimed to analyze the conceptualization, implementation, and reflective dimensions of PBL among master's students to develop a framework that enhances educational practice and skill development.

2. METHOD AND MATERIALS

To conduct the study thoroughly, a reflective descriptive qualitative research method was initially chosen to trace the implementation of project-based learning and subsequently reflect on its six-stage execution. Only qualitative data were collected from three instruments, namely a day-to-day diary to keep track of the project's development, participant observation to gain an angled vision of students' lived experiences, and participants' written reflections to record well-thought-out written productions of their project-based learning-oriented journey. As regards the data analysis, the day-to-day diary and participant observation data were analyzed and synthesized into a global table (see Appendix A) that portrays all the main steps that students went through to

complete the project-based learning. As for the reflective written pieces, analysis was conducted using ChatGPT, recognized for its effectiveness in data analysis (Islam & Islam, 2023; Xames & Shefa, 2023). Subsequently, the chatbot was employed to generate tentative themes, aiming to identify common points across all six essays. This helped to couple the three sources of data and therefore word the findings of the study.

2.1. Participants

The objective of this research was to trace the implementation of Problem-Based Learning (PBL) in the English Language department at the University of Abdelhamid Ibn Badis. The study specifically focuses on second-year master's students specializing in applied linguistics. The project groups the cohort into groups, and each one has not only to design third-year foreign language lesson plan(s) but also to execute them on the terrain in a high school in the wilaya of Mostaganem. This study does not regard the outcome but the step-by-step process the students went through to bring this project to fruition.

The experiment involved diverse participants: initially, the researcher responsible for project supervision; secondly, the students engaged in the Problem-Based Learning (PBL) project; and thirdly, the high school mentors providing the students with the chance to impart lessons based on their pre-planned lesson plan(s) to their pupils.

In this investigation, there were 46 participants from the same Master's specialty, encompassing the entire cohort. The sample included 9 males and 37 females, with ages ranging from 21 to 28 years. Among these participants, the heads of the groups (08) were asked to write a reflective piece on their experience in this PBL-focused pursuit; only six of them wrote one.

Four high school teachers played the role of mentors as they welcomed the students into their classes and allowed them to deliver a lesson to their pupils. They additionally gave constructive feedback pre- and post-the presentation to allow the students to make appropriate adjustments before the presentation and after it to enable them to craft a well-rounded end-product.

2.2. Data collection tool

The experiment involved the implementation of a project-based learning (PBL) approach within the EFL context, specifically in the E-learning module. Aligned with the features and steps discussed in the literature review, the project unfolded over several phases, each meticulously detailed in Appendix A.

The project commenced with the identification of a driving question, shaping the overarching goal. Centered on transforming a traditional classroom into an engaging, motivated, and enjoyable learning environment, students pondered how a tertiary cluster could contribute to their community and transform a traditional third-year secondary class, where students are bored, passive, and demotivated, into a modern classroom where students are engaged, motivated, and find pleasure in diving into the learning process.

The final product was envisioned to align with the project's goal and the module's content. The researcher proposed a practical solution: designing a schoolbook unit for a chosen secondary level, incorporating technology through Information and Communication Technologies (ICTs). Emphasizing inspiration over mere assignment completion, students embraced the idea with commitment, envisioning a lasting impact on their society.

Defining the features of the final product involved selecting a third-year secondary school textbook as the prime source, focusing on its third unit with language objectives. Criteria such as creativity, technology integration, the number of lesson plans, and pedagogical support were delineated. The end-product, a set of lesson plans, reflected the creative and research-driven process, measured against specific criteria to gauge its quality.

Managing nearly fifty students requires a strategic plan. Eight volunteered as group leaders, which facilitated logistical organization and task division. Each group focused on a language skill, ensuring comprehensive coverage.

Sub-groups emerged for practical testing, each oriented toward a different high school, optimizing opportunities to refine their product.

The project's pragmatic aspect unfolded through a partnership with Mostaganem's local high schools, aligning with students' teaching profession aspirations. The researcher collaborated with the Directorate of Education and selected ten high schools for training. This phase, referred to as the training period, allowed students to present their products and learn from the teaching-learning process under the supervision of host teachers or mentors.

2.3. Data analysis technique

The most challenging aspect involved project assessment due to time constraints and logistical challenges. The absence of a predefined assessment system led to the creation of a grid midway through the project, with ongoing student input. For the summative assessment, students presented the final product in high schools, submitting a written report and providing an oral presentation. This comprehensive approach constituted the summative assessment of the module.

3. RESULTS

After carefully planning, executing and reflecting on the project-based learning five main key elements emerged into prominence namely 1. project launch, direction, and collaborative work, 2. crafting the end-product and challenges, 3. exploring the new environment and the impact of ICT in teaching, 4. project-based learning assessment, and more importantly, 5. the four-fold framework for optimizing PBL implementation.

3.1. Project launch, direction, and collaborative work

The initiation of the project witnessed an enthusiastic adoption after a comprehensive explanation was given to the participants. This acceptance set the stage for a two-month endeavor conducted over the mid-term of the first semester, extending beyond traditional classroom boundaries and closely directed by the researcher. Noteworthy was the purposeful immersion and continuous involvement of students in the project's design, which made each challenge be perceived as a valuable learning opportunity and thus enabled them to put their content knowledge into use. This clearly signals, to some extent, that the participants exercised a level of problem-solving competency. One of the participants explains how he perceived these barriers by stating that: "All these obstacles were optimistic energies to go forward and never give up," participant 3. In parallel, collaborative work unfolded, with details regarding context, level, and specialty established by week 3. Group division into eight teams, each led by a group leader, allowed for efficient organization and management in tandem with the focus on applying their background knowledge alongside their creativity to come up with an innovative instructional method that will engage and motivate the 21st-century high schoolers. Another significant finding is the use of the experience emulation technique by sharing successful approaches of high-performing group(s) with those who faced similar challenges, which significantly fostered a collaborative atmosphere. This finding is consistent with that of Scarbrough et al. (2003), who tried to replicate what works in high-performing groups to low-performing ones in order to maximize the learning process. On the other hand, unexpected elements emerged prominently as a result of this collaborative work; the heightened level of sociability and the enjoyment of the learning journey, as one participant articulated: “I enjoyed learning with my colleagues because we were like a family” participant 1. Another added, “I spent unforgettable moments with my team members because it brought us closer," participant 6. Similar sentiments were expressed by another participant, stating: "The moments we have shared will always be in my memory and they will remain a family to me" participant 4.

3.2. Crafting the end-product and challenges

The intensive phase of crafting the end-product took place during the off-season holidays, leveraging communication channels like Skype and Facebook groups for effective interaction. This facilitated sharing materials, exchanging ideas, and mutual motivation. This finding accords with Otanasap et al. (2016) observations,

which demonstrated that using social media in project-based learning could achieve high levels of knowledge sharing, collaboration, and satisfaction. On the flip side, the inaccessibility of the internet during this period hindered some groups from properly working on the project. From another perspective, challenges emerged, with one participant reflecting, "I thought it was very simple, and it would be boring, but when we decided to begin, it was very difficult, but it was very enjoyable, interesting, and too helpful for us"participant1. One of the major challenges involved a minority of students who lacked basic digital skills, which prevented them from doing simple and effective internet research. This prompted the researcher to provide a step-by-step procedure to optimize the process. Week 7 marked the completion phase, with students polishing their products. Additionally, psychological preparation instructions were imparted to guide students in navigating the challenges and unexpected realities that awaited them and hence straightening up the utopic mindset that some participants had when they initially embarked upon that learning journey.

3.3. Exploring the new environment and impact of ICT in teaching

As students ventured into high schools during week 8, they attended classes and thus could observe the teaching and learning process, which confronted the participants with the current challenges and responsibilities of the teaching profession. The positive impact of ICT in teaching was underscored by participants, with one expressing, "Using ICT in teaching not only allows learners to control their own learning process but also provides them with ready access to an infinite amount of information," participant 1. Weeks 9 and 10 marked the implementation of the end-product, with students integrating teacher feedback for necessary modifications, which entails that not only did they design the lesson plan, but also executed it and enhanced it thanks to the valuable mentors' feedback. This highlights the necessity for continuous learning. In the same line of thought, an important element to consider is the fact that some participants learnt to use new software such as Movie Maker and Google Pictures to design audio-visual materials that were needed for the completion of their end-product. In other words, this self-directed learning enabled them not only to teach themselves new software but also to make use of it to produce quality pedagogical materials to be used in class. This finding supports and corroborates the work of Loyens et al. (2008), which confirms that PBL can foster self-directed learning, and so do other studies in this area (Abubakar & Arshad, 2015; Leary et al., 2019). What is even more rewarding is the students' profound sense of accomplishment as portrayed by one of the participants: "This work provided me with huge ideas, experience, and feelings. I feel confident to do something which can help me in the future while teaching" participant 5. She adds: "This project took me so much time to finish. I have learned so much and even more than I expected".

3.4. Project-based learning assessment

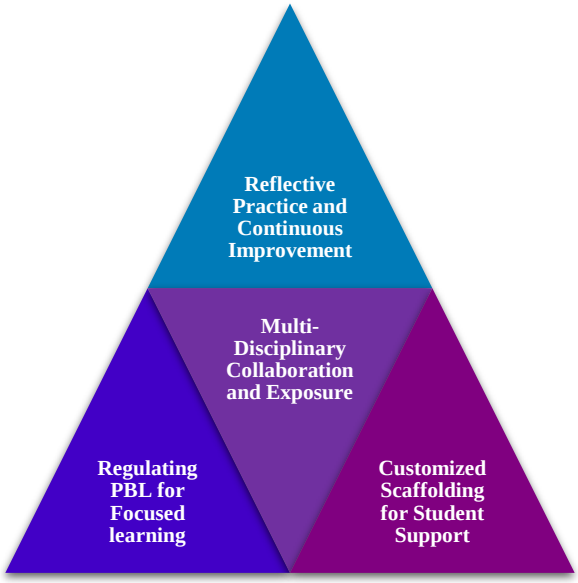
This phase was by far the most challenging part, as there were so many elements to take into consideration. Therefore, the assessment phase of the PBL project encompassed a comprehensive summative evaluation. Students were tasked with consolidating the entirety of their journey into a written report, meticulously adhering to a pre-designed template provided for them by the project leaders. This report served as a reflective documentation capturing both individual and collaborative efforts invested by the students throughout the project. To ensure an equitable assessment that acknowledged each student's hard work, a deliberate measure was taken. Each student was required to explicitly associate their name with the specific parts of the work to which they contributed. The subsequent component of the assessment involved an oral presentation where students adeptly highlighted three distinct facets: collaborative contributions, personal input, and feedback pertaining to the practical aspects of the project. This meticulous assessment process aimed not only to gauge the project's success but also to recognize and appreciate the unique contributions of each student. This holistic assessment in project-based learning is consistent with the literature and thus supports evidence from previous observations, such as those of van Der Vleuten and Schuwirth (2023), who sought to develop a holistic approach to equitably assess their students who took part in a PBL journey.

3.5. Four-protocol framework for optimizing PBL implementation

In addition to these basic steps to deploying PBL, a four-protocol framework was inferred to optimize and maximize PBL implementation (Figure 1). Customized scaffolding for student support and regulating PBL for focused learning are the two foundational protocols that uphold the framework. At its core, the framework emphasizes multi-disciplinary collaboration and exposure, culminating in the pinnacle protocol, which is sustained by all others: guiding students toward reflective practice and continuous development. It is important to note that the different levels of the pyramid do not suggest a hierarchical system but rather represent critical elements that can significantly magnify the PBL learning experience.

Figure 1

A Four-Protocol Framework for Optimizing PBL Implementation



3.5.1. Customized scaffolding for student support

The researcher's scaffolding was of significant assistance to learners in troublesome situations. However, there were still students who were struggling with some parts of the PBL project because it was not easy for them to verbalize their thoughts. There are two types of scaffolds, soft and hard (Saye & Brush, 2002). The former provided students with mechanisms that can guide them throughout their learning journey by expecting and planning, as the instructor can anticipate approximately their difficulties (p. 81). Conversely, the latter, soft scaffolds "are dynamic and situation-specific supports provided based on learner responses" (An, 2013), which means they vary from student to student according to their respective needs and the issues they are facing. This customized scaffolding can drastically optimize the learning process of students in distress.

3.5.2. Regulating PBL for focused learning

Working on a PBL project can be stressful for students who are not accustomed to such a new instructional model. Therefore, the project leader is to be very tactful and prudent by not overloading them with unnecessary additional information regarding the PBL, as it might be confusing for them. To avoid such a hindrance, the instructor has to give concise and clear guidelines for the PBL project to students by using a checklist and a bullet point summary of the objectives to work toward, rather than lengthy academic materials. Johnson and Johnson

(2009) advise educators leading projects to "explain the task and their interdependence" while spotlighting the correlation among the different elements that come into play in achieving the PBL project.

3.5.3. Multi-disciplinary collaboration and exposure

The applied linguistics discipline is about leveraging the findings of research and utilizing them in solving real-world language issues in various specialties. Nonetheless, university students generally operate mainly within the restricted walls of their field of study. What would be interesting is that, when working on projects, the supervisor can expose them to the possibility of exploring a partnership with other specialties, where a student of the targeted specialty can schedule synchronous meetings with the group. If given the chance, this synergic multi-disciplinary union can enable them to learn a great deal from each other. They will have the ability to benefit from their expertise mutually while developing higher-order thinking and reflection skills. This will certainly lead to the conception and creation of high-quality products through the collaboration and cooperation of both parties. This is in line with the findings of Ellingsen et al. (2021), who affirm that interdisciplinary engagement enhances students' comprehension of how complex ideas come to fruition, and the introduction to different viewpoints encourages them to challenge their prior knowledge, resulting in more effective solutions and richer understanding.

3.5.4. Reflective practice and continuous improvement

No matter how much time and energy students spend designing the outcome, they must understand that learning has no endpoint; it is ever evolving and continuous. Therefore, they should reflect and critically analyze their learning journey, which can potentially foster growth and deeper understanding. For this reason, it is essential to integrate a reflective protocol where students can evaluate their challenges and progress through reflective journals, group discussions, and post-project activities that further develop and sharpen their skills. Barroso and Morgan's (2012) study also emphasizes this aspect, noting that critical reflection within project-based learning boosts student skill development and metacognition, particularly benefiting advanced undergraduates and graduate students.

4. CONCLUSION

Capitalizing on PBL's potential provides students with numerous opportunities to broaden their horizons, refine their skills, and step out of their comfort zones to operate in a real-world context. Specifically, it has contributed, to some extent, to enhancing problem-solving competence, collaborative skills, creativity, and self-directed learning, which are integral components of 21st-century education. This study meticulously traced the conception, planning, and execution of the project-based learning journey in the EFL tertiary arena. The project launch, along with the collaborative work of the students, was delineated, focusing on the different skills required to bring the project to completion. Unexpectedly, a heightened degree of sociability and enjoyment was witnessed, which significantly enhanced peer coaching between high- and low-performing students within the same and different groups. These interactions were facilitated through various web-based means, which highlighted a lack of digital fluency in a minority of students. Students were able not only to test the end product in a real-world context but also to receive feedback on how to improve it from their respective mentors.

Specific PBL-related elements were considered in the evaluation process, of which students were previously informed. The four-fold protocol framework offers additional valuable insights on how to maximize the PBL learning objectives. These can serve as practical guidelines for any teacher, educator, or policymaker who wishes to delve into the PBL world. Limitations of the study were primarily related to time constraints and administrative endorsement. Over the continuum of the PBL implementation, the former presented a challenging situation necessitating instructors' flexibility in adding sessions to supply more input related to the PBL methodologies, along with some asynchronous meetings to provide additional support. During the ongoing process of PBL application, a certain resistance was shown on the part of university partners—high schools—not granting full

resources to the students. As for the future directions of the research, studies could be conducted on how to better infuse the PBL process in general and the presented framework in particular with artificial intelligence, where the possibilities are endless. This could revolutionize PBL-driven pedagogy.

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Appendix A

Timeline and procedures of the experiment

Phase	When	N° week	Procedure	Material	Research instrument
Launching the project	**Before the holidays**	Week 1&2	- Explain the whole concept of the project - Pointing out the objective of the project - Laying out the consequences and the merits of the project - Organizing and dividing the cohort into groups - Answering all the questions relating to the project - Assigning a language skill to work on for each group		
Collaborative work		Week 3	- Choosing the context, the level, and the specialty as a frame of reference for the project, alongside selecting the context where the PBL project will be carried out		- Observation - work-in-progress discussion
		Week 4	- Adjusting so that students will be able to apply what they have designed in the same time frame as the secondary school curriculum. - Replicating what is working in high-performing groups to low-performing ones. - Developing a rubric (group work) - Explaining unclear points through discussion - Checking the work-in-progress of each group - Providing tips on group management and leadership - Highlighting the pedagogical material to use - Stressing the use of technology and ICTs when designing the product - Provide them with a copy of the targeted textbook unit	- The list of instructions for the learners	- Observation - Project diary - work-in-progress discussion
Crafting the product	**During the holidays**	Week 5	- Discussing and explaining all the instructions - Urging all the leaders to create a Facebook group	- The list of instructions for the learners	- Observation - Project diary - work-in-progress discussion

		Week 6	- Operating in a Blended learning environment - Supervision of the work-in-progress of the groups - Identifying the difficulties they were facing and finding ways to solve them	- How to make an effective search	- Facebook group monitoring
Finalizing the product	**After the holidays**	Week 7	- Finalizing the product - Explaining all the instructions to follow for the practical part - Preparing students psychologically for the new terrain they were about to operate in	- Leaders' instructions - psychological preparation	- Observation - Project diary
Exploring the new environment		Week 8	- Exploring and getting familiar with the new environment (high school) - Feedback on the proposed assessment grid and whether to add other elements	- Proposed assessment grid	- Observation - Field notes
Implementing the product		Week 9 & 10	- Feedback on the lesson plan before the presentation - Presenting the end-product - Feedback from the host teacher on the performance		- Observation - Field notes
Assessment		Weeks 11 and 12	- Wording of the written report - Preparing the oral presentation of the end-product for the university teacher	The outline model	