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Exploring the impact of project-based learning on critical thinking and soft skills development among Moroccan EFL students

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Abstract

This study examines the effects of Project-Based Learning (PBL) on the development of critical thinking and soft skills among 12th-grade Moroccan EFL students. The study used a qualitative research design and involved 24 students who participated in a PBL unit focused on addressing child marriage. Data collection methods included focus group discussions and reflections from the teacher-researcher. The findings show that PBL effectively enhances critical thinking by involving students in activities that require them to learn and apply various skills such as analysis, evaluation, and synthesis of information in real-life situations. Students also reported increased engagement and improvements in critical thinking skills as well as some soft skills, particularly in teamwork and communication. However, the study identified challenges related to time management and unequal participation in group tasks. The study emphasizes the potential of PBL to enhance students' critical thinking and essential skills in educational settings, specifically in an EFL context. Recommendations of the study include implementing strategies to improve time management and establish clear group roles to maximize the benefits of PBL.

Keywords: Project-based learning; Critical thinking; Soft skills; EFL teaching; Collaboration

1. Introduction

Developing critical thinking is essential for students to effectively process complex information, make informed decisions, and solve problems. In today's fast-paced and information-rich world, critical thinking has become more important than ever. It empowers students to analyze, evaluate, and synthesize information, hence fostering independent thinking and lifelong learning.

In response to the demands of the 21st century, Morocco has implemented significant educational reforms to enhance the quality and relevance of education (Morchid, 2020; World Bank, 2015). A key goal of these reforms is to promote critical thinking among students, as outlined in the strategic vision for Moroccan school reform (2015–2030) and the Education Act of 2019. However, effectively teaching and assessing critical thinking in Moroccan classrooms remains challenging due to a lack of adequate training, resources, and pedagogical strategies among teachers (Llorent Bedmar, 2014; Chouari & Nachit, 2016).

PBL has emerged as a promising approach to fostering critical thinking. It engages students in real-world projects that require them to apply their knowledge and skills to solve problems. This method not only boosts engagement and motivation but also promotes a deeper understanding and retention of knowledge. Through project work, students practice and develop critical thinking skills as they plan, research, collaborate, and reflect on their learning processes and outcomes.

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This study aims to explore students' perceptions of critical thinking skills development through PBL in Morocco. It seeks to understand how PBL influences students' critical thinking skills, the challenges and benefits associated with its implementation, and its overall impact on students' learning experiences. The study aims to provide insights into the effectiveness of PBL in enhancing critical thinking among Moroccan high school EFL students, contributing to the broader discourse on educational practices and pedagogical innovations in the EFL context.

2. Literature Review

In recent years, there has been a growing emphasis in education on the development of essential skills that extend beyond traditional academic knowledge. This shift is driven by the increasing recognition that the challenges of the 21st century demand learners who possess not only knowledge but also the ability to think critically, solve problems, and collaborate effectively. Educational methodologies that promote these competencies are garnering global attention, with PBL emerging as one of the most promising approaches. Concurrently, the significance of critical thinking has become a focal point in educational discussions. This literature review examines these interconnected aspects of modern education, exploring the definitions, characteristics, and global perspectives on PBL and its role in nurturing critical thinking, especially within the framework of Morocco's evolving education system.

2.1. Project-Based Learning

This section examines the core elements of PBL, including its theoretical foundations, pedagogical benefits, and its global adoption as an educational strategy. By highlighting its effectiveness in promoting engagement, deeper learning, and the development of 21st-century skills, this section outlines why PBL is increasingly recognized as a transformative approach to education.

2.1.1. Definition and Characteristics

PBL is an instructional approach that engages students in active exploration of real-world challenges and problems. This approach helps students gain a deeper understanding of the subject matter while developing essential skills. Unlike traditional teaching methods, which often involve passive absorption of information, PBL requires students to apply their learning to hands-on projects that reflect real-world scenarios. Through this process, students engage in inquiry, research, collaboration, and problem-solving, which leads to a more meaningful and authentic learning experience (Bell, 2010). The key characteristics of PBL include learner autonomy, collaboration, and integration of interdisciplinary content, all aimed at fostering critical thinking, creativity, and communication skills (Thomas, 2000). Projects typically span several weeks or months and are designed to encourage students to take ownership of their learning by setting goals, making decisions, and reflecting on their outcomes.

PBL is rooted in the constructivist theory of learning, which suggests that knowledge is best constructed through active engagement and social interactions (Piaget, 1973; Vygotsky, 1978). This approach aligns with the demands of 21st-century education as it cultivates skills such as critical thinking, collaboration, and adaptability, which are essential in today's rapidly changing world. Moreover, PBL emphasizes the teacher's role as a facilitator rather than a direct instructor, guiding students through their learning processes instead of merely delivering content in a didactic manner. This shift in instructional roles helps promote student agency and deeper engagement with the material (Blumenfeld et al., 1991).

2.1.2. Global Perspective

PBL has gained widespread acceptance across various educational levels worldwide, from primary schools to higher education, as a strategy to foster active and engaged learning. Countries like Finland, South Korea, and Singapore have incorporated PBL into their curricula to enhance students' innovation and problem-solving abilities, contributing to their high-performing educational systems (OECD, 2016). For instance, Finland, renowned for its progressive education system, extensively employs PBL to cultivate students' collaborative and independent thinking skills (Sahlberg, 2011). In the United States, PBL has become increasingly popular as part of the deeper learning movement, where students are expected to master not only academic content but also critical thinking and problem-solving skills (Darling-Hammond et al., 2014).

Research consistently indicates that PBL boosts student engagement and academic performance. Strobel and van Barneveld (2009) discovered that students participating in PBL exhibited better retention of content knowledge, higher-order thinking skills, and increased motivation compared to those in traditional learning settings. Similarly, a meta-analysis by Walker and Leary (2009) demonstrated that PBL promotes the development of transferable skills such as collaboration, critical thinking, and self-directed learning, which are essential for success in both academic and

professional environments. Additionally, PBL's focus on real-world applications equips students to meet the demands of the modern workforce by encouraging creative and collaborative problem-solving, a skill set highly valued by employers (Condliffe, 2017).

In summary, PBL is an internationally recognized teaching method that not only enhances content learning but also prepares students with vital 21st-century skills. Its implementation across diverse educational contexts underscores its flexibility and effectiveness in promoting deeper learning, engagement, and skill development. As education continues to evolve, PBL remains a promising approach to addressing the dynamic needs of learners globally.

2.2. Critical Thinking in Education

This section explores the definition of critical thinking and its growing significance in curricula aimed at fostering independent, reflective, and analytical learners. By discussing the challenges of teaching critical thinking and its close relationship with PBL, the section underscores the importance of integrating these skills into educational systems, particularly in the context of broader efforts to reform and modernize learning environments.

2.2.1. Definition and Importance

Critical thinking involves the cognitive processes of analyzing, synthesizing, and evaluating information in a structured and disciplined way to guide decision-making and problem-solving. It involves reasoning, reflective judgment, and the ability to assess the validity of arguments or claims based on evidence (Facione, 1990). In educational settings, critical thinking is crucial for developing students' analytical and problem-solving skills, enabling them to tackle complex issues both inside and outside the classroom. Critical thinkers can question assumptions, identify biases, explore alternative viewpoints, and make informed decisions, which are essential skills in today's rapidly changing world (Paul & Elder, 2008).

The significance of critical thinking in education has grown as schools strive to prepare students for the demands of the 21st century. Integrating critical thinking into curricula allows students to move beyond rote memorization and engage more deeply with content, fostering intellectual independence and resilience in facing new challenges (Ennis, 2011). In addition, research indicates that critical thinking skills are closely linked to academic success, employability, and active citizenship, making them essential for both personal and professional growth (Halpern, 2014).

2.2.2. Challenges in Teaching Critical Thinking

Despite its importance, teaching critical thinking in educational settings presents several challenges. One major difficulty is the traditional emphasis on content memorization rather than the development of higher-order thinking skills. Many educational systems still prioritize standardized testing and factual recall, leaving little room for fostering critical thinking (Abrami et al., 2015). Furthermore, educators may lack the necessary training or resources to effectively teach critical thinking, as this skill requires a different pedagogical approach that emphasizes inquiry, discussion, and active learning, rather than lecture-based instruction (Choy & Cheah, 2009).

Cultural factors can also pose challenges, as critical thinking involves questioning authority, exploring multiple perspectives, and challenging existing beliefs and practices, which may not always align with traditional educational values in some regions (Alkire, 2012). Also, students may struggle to adapt to the demands of critical thinking, especially if they are used to passive learning environments where the teacher is the main source of knowledge. Resistance to critical thinking often arises from the fear of making mistakes or dealing with ambiguity, both of which are parts of developing this skill (Paul & Elder, 2008).

2.3. PBL and Critical Thinking in Morocco

The Moroccan education system has seen significant reforms recently, with a growing focus on student-centered learning. Traditionally, education in Morocco has been teacher-centered, emphasizing rote learning and factual information recall, which has limited the development of critical thinking and problem-solving skills (Zaid, 2017). However, with the broader educational reforms under the National Charter for Education and Training, there's been a shift towards more active and participatory learning methods like PBL. PBL aligns with Morocco's strategic goal of preparing students for the global economy by fostering skills such as collaboration, creativity, and critical thinking (World Bank, 2019).

Despite these reforms, the adoption of PBL in Moroccan schools has been uneven. While some schools, especially private and international ones, have embraced PBL, many public schools struggle with resource constraints, large class sizes, and a lack of teacher training in PBL methodologies (Jabbari, 2017). Moreover, traditional assessment methods that

emphasize memorization and standardized testing still dominate, creating barriers to the broader adoption of PBL and the development of critical thinking.

Several studies have explored the impact of PBL on the development of critical thinking among Moroccan students. Research consistently shows that PBL can significantly enhance critical thinking skills by promoting active learning, collaboration, and real-world problem-solving. For instance, Khalidi (2020) found that Moroccan high school students involved in PBL projects exhibited higher levels of critical thinking, as measured by their ability to analyze and evaluate information, compared to those in traditional learning settings. This study highlighted how PBL encourages students to explore multiple perspectives and engage in reflective thinking, both essential components of critical thinking.

Similarly, Bouziane (2019) examined the impact of PBL on Moroccan university students' critical thinking skills and found that those in PBL-based courses demonstrated improved reasoning and decision-making abilities. The study also noted that PBL fostered a more student-centered learning environment, where students took greater responsibility for their learning and engaged more deeply with the course content. These findings are supported by international research, which shows that PBL leads to improved critical thinking, especially when students are tasked with solving real-world problems and collaborating with peers (Strobel & van Barneveld, 2009).

However, challenges remain in implementing PBL in Morocco, particularly in public schools, where limited resources and traditional teaching practices hinder its widespread adoption. Teacher training is crucial, as many Moroccan teachers lack the pedagogical knowledge and support needed to effectively facilitate PBL and promote critical thinking in the classroom (Astaifi & El Kirat, 2023; Jabbari, 2017). Furthermore, the reliance on standardized testing as the primary mode of assessment continues to limit opportunities for students to practice critical thinking in meaningful ways.

While PBL has shown potential for fostering critical thinking in Moroccan educational settings, fully integrating it into the national curriculum faces several obstacles. Addressing these challenges will require ongoing investment in teacher training, curriculum development, and transforming assessment practices to prioritize critical thinking and problem-solving skills over memorization.

3. Material and methods

This study investigated the implementation of PBL and its impact on Moroccan EFL students' perceptions of critical thinking skill development. Specifically, the research was designed to address the following questions:

- How is PBL implemented to support critical thinking practices?
- What are students' perceptions of critical thinking skills development through PBL?
- How does PBL contribute to the development of other soft skills?

To gain a deep understanding of students' experiences, a qualitative methodology was adopted. This approach allowed for an in-depth exploration of the research questions, given their exploratory nature.

3.1. Participants and settings

The study involved 24 Moroccan 12th-grade EFL science stream students, aged 16-17, who were selected using convenience sampling. Although this method might limit the broader applicability of the findings, it allows for a deep exploration of the development of critical thinking skills within a specific educational context. The selection of 12th-graders was based on their intermediate to upper-intermediate language proficiency, which aligns with the curriculum's requirements and prepares them for their imminent transition to higher education.

The study was conducted at a public high school in Morocco, which serves students from mostly low-income families. This setting was chosen because it provides valuable insights into PBL implementation in a disadvantaged educational environment.

3.2. Data Collection Methods

The study used a dual-method approach, combining teacher-researcher reflections to document the implementation of PBL and focus group discussions to gather students' perspectives and experiences. This qualitative methodology was chosen for its ability to provide a comprehensive understanding of both the outcomes and underlying processes that impact students' critical thinking skills.

The teacher-researcher's reflections provided insights into the process of PBL implementation, while the focus groups, structured around carefully designed questions, explored the students' perspectives. Both male and female students were equally represented in the sample, ensuring a gender balance. The comprehensive approach to data collection enhanced the credibility of the study and provided a deeper analysis of CT skill development in an educational context.

The focus group discussions were based on ten carefully crafted questions aimed at eliciting detailed student insights into PBL experience, CT development, and the growth of other soft skills. The questions were developed by the researcher and reviewed by a field expert to ensure validity. They were then tested through a pilot focus group, which allowed the researcher to further refine the questions.

3.3. Data Collection Instruments

Two recording devices, an iPhone 13 smartphone, and an Asus laptop, were used to ensure high-quality audio during the focus group sessions. The audio recordings were transcribed verbatim the following day to maintain the accuracy and freshness of the data. During the focus groups, the researcher also observed non-verbal cues (e.g., nodding, facial expressions) to provide additional context to the students' responses.

3.4. Data Analysis

The data analysis process involved several steps. The focus group discussions were transcribed and then coded using a thematic analysis approach. The thematic analysis allowed for the identification of key themes related to critical thinking skill development and the acquisition of other soft skills, such as collaboration and communication. Emergent themes were categorized into sub-themes, and illustrative excerpts from the transcripts were used to support the analysis.

Teacher-researcher reflections were also analyzed, with data categorized according to themes related to PBL implementation and its impact on student learning outcomes. This allowed for a comparison between the teacher's observations and the students' perceptions gathered during the focus groups.

3.5. Triangulation and Reliability

To enhance the validity and reliability of the findings, a triangulation methodology was employed. Data were cross-referenced from multiple sources—teacher-researcher reflections, focus group discussions, and non-verbal observations—providing a richer understanding of the students' experiences. This approach, combined with the inclusion of both male and female students across different language proficiencies, strengthened the credibility of the study.

4. Findings and discussion

This part is divided into two sections that are directly related to the research questions addressed in the study. The first section provides an account of the teacher-researcher's reflective analysis and evaluation of the PBL implementation. It explores the PBL framework application, the students' outcomes, and challenges, and culminates with final observations. Section two explores students' perceptions of the PBL intervention and its contribution to the development of critical thinking and soft skills.

4.1. Implementation of PBL to Support Critical Thinking Practices

The findings from this study indicate that PBL was effectively implemented in the Moroccan EFL classroom to enhance critical thinking skills. The teacher-researcher's reflections emphasized the structured integration of PBL components such as the driving question, sustained inquiry, critique and revision, public product, and reflection, which were woven into various stages of the project.

The PBL framework encouraged students to engage in tasks that required analysis, evaluation, and synthesis of information, promoting higher-order thinking.

Driving Question: The driving question engaged students with a real-world issue through videos and discussions, prompting inquiry and critical thinking. It served as a guide throughout the project, leading students to formulate sub-questions, gather information, and explore solutions, stimulating critical thinking.

Research supports the role of driving questions in promoting inquiry and critical thinking. A study by Kokotsaki, Menzies, and Wiggins (2016) highlights that PBL driving questions, which are often open-ended and linked to real-world issues, engage students in meaningful tasks requiring deeper investigation. In EFL contexts, such questions challenge learners to analyze and synthesize language and content knowledge, thereby fostering critical thinking. Similarly, research by Belland, Kim, and Hannafin (2013) demonstrates that driving questions encourage students to engage with content on a higher cognitive level, prompting them to generate sub-questions, seek out information, and critically evaluate data.

Sustained Inquiry: Students researched to explore the causes and effects of child marriage, sharpening their analytical skills through the evaluation of diverse sources. Tools like rubrics and project planners were provided to structure their investigation, aligning with PBL's emphasis on guided inquiry. The inquiry included phases, the first was reading to understand the issue (understanding), the second, researching the root causes of child marriage and its impact on the child, the family, and the community or society (analysis), the third involved evaluating the already implemented strategies to fight child marriage at the level of the government, at the level of organizations, and the level of family, the fourth taking action, by suggesting solutions and sharing them.

Empirical evidence underscores the role of sustained inquiry in developing analytical and critical thinking skills. A study by Blumenfeld et al. (1991) emphasizes that guided inquiry in PBL, structured through tools such as rubrics and project planners, helps students refine their research skills, assess the reliability of sources, and engage in ongoing analysis. In EFL classrooms, inquiry-based approaches have been shown to enhance critical thinking by promoting the evaluation of diverse linguistic and cultural texts (Beckett & Slater, 2005). The use of inquiry to investigate complex societal issues, such as child marriage, sharpens students' abilities to critically assess multiple perspectives and develop well-supported arguments.

Solution Development: Students applied critical thinking to propose solutions, collaboratively refining ideas through feedback and revision. The focus on feedback and improvement reflected the PBL principle of critique and revision, enhancing the quality of students' work and their cognitive skills.

Research highlights the impact of solution development in PBL on students' critical thinking and collaboration. According to a study by Hmelo-Silver (2004), PBL encourages students to work collaboratively to propose solutions, receiving feedback that helps them refine their ideas. This iterative process of critique and revision, as described in this study, is supported by research showing that feedback improves not only the quality of student work but also their higher-order cognitive abilities (Van den Bossche, Gijssels, Segers, & Kirschner, 2006). In this way, PBL fosters a learning environment where students critically reflect on their ideas and refine them based on peer and teacher input.

Public Product Creation: Students created and presented a final product, enhancing communication skills and engaging with an authentic audience. Students were allowed to choose the format—posters, brochures, videos, etc.—which encouraged autonomy and ownership. Sharing their work with an authentic audience aligned with PBL's focus on real-world application and accountability.

The creation of a public product is central to PBL's real-world relevance and has been shown to enhance both communication skills and critical thinking. According to Thomas (2000), presenting to an authentic audience requires students to clearly communicate their ideas and defend their reasoning, further developing their analytical and evaluative abilities. In this study, students' autonomy in choosing the format of their final product (posters, brochures, videos) reflects a critical element of PBL—student choice—which has been linked to increased engagement and ownership of learning (English & Kitsantas, 2013). The real-world application of knowledge through public presentations also reinforces the development of accountability and deeper understanding.

Reflection: The final stage focused on students reflecting on their learning process. Reflection prompts guided this process, helping students think about their strengths, challenges, and areas for growth. This stage helped in fostering self-assessment and metacognitive growth.

Reflection is a key metacognitive process in PBL, as highlighted in several studies. For example, Schön's (1983) concept of "reflection-in-action" emphasizes that learners deepen their understanding by reflecting on their thinking processes, identifying strengths and weaknesses, and considering alternative approaches. This process is crucial for fostering self-assessment and promoting critical thinking. Similarly, a study by Kramarski and Mevarech (2003) found that structured reflection helps students internalize their learning, leading to greater metacognitive awareness and critical thinking. The observations that students engaged in reflective practices and developed argumentation skills align with these findings.

4.1.1. Student Outcomes and Challenges

Students showed improved ability to question assumptions, critically assess information, and provide solutions to real-world problems. For example, during their project on child marriage, students gathered data from various sources (watching videos, reading articles, using statistics, and searching the internet), evaluated the reliability of their findings, and proposed actionable solutions.

While most students adapted to the open-ended nature of PBL, some initially struggled with the absence of direct answers. However, with appropriate teacher support and help from peers, many of these students became more comfortable with ambiguity and gained confidence in handling complex tasks over time. One student commented, *"It was difficult at the beginning to find information and analyze it, but we learned a lot and how to decide if the information was true and relevant."*

The improvements in students' critical thinking abilities observed in this study are well-supported by the literature. For instance, Savery (2006) found that students engaged in PBL demonstrated a higher capacity for questioning assumptions, evaluating information, and synthesizing ideas. The challenges some students faced initially, particularly with ambiguity and the lack of direct answers, are also common in PBL contexts. Studies by Dole, Bloom, and Doss (2017) highlight that students often struggle at the beginning of PBL due to the shift from traditional teacher-led instruction to a more student-centered, inquiry-based model. However, with appropriate support, students typically adapt and develop greater confidence in managing complex tasks.

4.1.2. Teacher-Researcher Observations

Teacher-researcher observations revealed increased student engagement in reflective practices, a crucial step in metacognition. Students regularly discussed their reasoning processes, challenging each other's assumptions and improving their argumentation skills.

The increase in student engagement with reflective practices, as observed in this study, is corroborated by research on metacognition in PBL. A study by Mezirow (1990) indicates that reflective dialogue helps students critically analyze their reasoning, challenge assumptions, and refine their thought processes. This reflective practice is a cornerstone of effective PBL implementation and is associated with long-term gains in critical thinking and self-directed learning.

To conclude, this study highlights the significant effectiveness of Problem-Based Learning (PBL) in nurturing critical thinking skills in EFL classrooms. Through opportunities for inquiry, problem-solving, collaboration, and reflection, PBL fosters the cognitive abilities that are crucial for both academic and professional success. The strong support from existing literature further validates these findings. PBL's elements (driving questions, sustained inquiry, solution development, creation of public products, and reflective practices) create a fertile ground for critical thinking and problem-solving. The consistency between this study's findings and previous research underscores PBL's role in cultivating essential cognitive skills for educational and professional advancement.

4.2. Students' Perceptions of Critical Thinking Skills Development through PBL

When students reflected on their PBL experience, they generally had a positive view of how it improved their critical thinking (CT) skills. Most students described critical thinking as the ability to analyze, evaluate, and synthesize information, and they found that PBL effectively engaged them in higher-order thinking tasks. For instance, Safaa emphasized the evaluative nature of CT, explaining that it involves *"critiquing ideas"* and assessing the validity of arguments. Houda similarly pointed to the importance of examining topics from multiple perspectives, demonstrating the role PBL played in fostering comprehensive analysis.

Students like Manar and Youssef illustrated how PBL enriched their knowledge and broadened their thinking by requiring them to engage with diverse sources of information. Manar, in particular, linked her development of CT skills to research, noting that PBL helped her expand her knowledge and apply it to real-world situations. Meanwhile, Youssef highlighted how PBL enabled him to shift from a narrow, one-sided view of issues to a more empathetic, multifaceted perspective, particularly when addressing complex societal issues like child marriage.

These reflections suggest that PBL not only deepened students' understanding of critical thinking but also encouraged them to apply these skills in practical contexts. The emphasis on inquiry, evaluation, and reflection throughout the PBL process supported students in developing a more nuanced and sophisticated approach to problem-solving and decision-making, in line with established CT frameworks that emphasize reasoning, evaluation, and objective judgment.

Empirical research supports students' perceptions of critical thinking development through PBL aligning with their reflections on the process. Studies such as Thomas (2000) highlight how PBL engages students in complex, real-world tasks that require analysis, evaluation, and synthesis, which enhance critical thinking. Gokhale's (1995) research also showed that collaborative, inquiry-based tasks in PBL environments encourage students to think critically by evaluating multiple perspectives and developing reasoned judgments. Similarly, a study by Beers (2011) demonstrated that PBL's structure—requiring students to engage in research, apply information to real-world problems, and reflect on their learning—promotes deeper cognitive processing, which is essential for critical thinking development. The findings from these studies reinforce students' reflections, such as Safaa's emphasis on evaluating arguments and Youssef's shift towards empathetic, multifaceted perspectives when tackling complex issues, illustrating that PBL enhances critical thinking by integrating higher-order thinking skills with practical and real-world applications.

4.2.1. PBL's Contribution to the Development of Other Soft Skills

In addition to promoting critical thinking, PBL also contributed to the development of a range of other essential soft skills, particularly collaboration, communication, creativity, and self-regulation. Many students reported that the group-based nature of PBL enhanced their ability to work as part of a team, requiring them to engage in effective communication, share responsibilities, and contribute to collective problem-solving. For example, Sabah highlighted how the project helped improve their ability to *"organize ideas and use resources efficiently,"* reflecting the development of organizational and collaborative skills.

Creativity emerged as another key skill fostered by PBL. Students like Sami underscored the creative aspect of critical thinking within the PBL framework, particularly in generating new ideas and defending them with evidence. The flexibility in choosing how to present their solutions, whether through posters, videos, or other formats—allowed students to explore innovative ways of communicating their findings. This creative freedom not only engaged students but also promoted their ability to think outside the box and develop original solutions to complex problems.

In addition, the PBL process encouraged the development of self-regulation and time-management skills. The open-ended nature of the projects required students to take initiative, plan their work, and manage deadlines, with limited teacher intervention. Badr's comment that *"the teacher is just a guide; we do everything by ourselves"* illustrates how PBL fostered independence and self-directed learning. However, some students, like Sabah, noted that the time-intensive nature of PBL posed challenges, suggesting that improved time-management strategies may be necessary for optimizing these projects.

Empirical evidence from various studies supports the contribution of PBL to the development of critical soft skills. For example, a study by Bell (2010) found that PBL fosters teamwork by encouraging students to work collaboratively in solving real-world problems, thereby enhancing their communication skills as they share responsibilities and negotiate solutions. Similarly, research by Kokotsaki, Menzies, and Wiggins (2016) demonstrated that PBL environments facilitate the development of creativity, as students are encouraged to think innovatively and present their solutions in various formats, fostering both critical thinking and creative expression. Moreover, the study by Hmelo-Silver (2004) highlighted that PBL promotes self-regulation, as the student-centered nature of this approach requires learners to plan their tasks, manage time effectively, and self-monitor their progress, ultimately leading to enhanced independent learning skills. These findings corroborate the assertion that PBL supports the growth of a broad range of soft skills essential for success in both academic and professional settings.

4.2.2. Challenges and Limitations

Although students generally had positive experiences with PBL, they also faced certain challenges and limitations. One major challenge was the time-consuming nature of the project-based approach. For example, Sabah mentioned that while PBL improved organization and research skills, it was often hard to manage the workload within the given time. Other students agreed, such as Meriem who explained that they had other subjects to prepare for.

Another observed limitation was the varying degree of student engagement. Some students, such as Houda, reported that their thinking did not change significantly, as they were already familiar with the process of working on similar projects. This highlights the importance of tailoring PBL tasks to ensure that they are appropriately challenging for all students, particularly those with prior experience in project-based tasks. Furthermore, group dynamics occasionally led to unequal contributions, with certain students taking on more responsibility than others, which might limit the full participation of all group members.

Several studies point out that the time-intensive nature of PBL can be challenging for students. For instance, Filippatou and Kaldi (2010) found that while students developed key skills such as research and critical thinking, they also faced

difficulties managing the extensive time requirements. Similarly, research by Dole, Bloom, and Kowalske (2016) emphasized that students often struggle with balancing the demands of PBL with other academic responsibilities, leading to challenges in managing their workload effectively. This suggests that time-management support within PBL is crucial to mitigate such issues.

This indicates a need for better time-management support within the PBL structure.

The issue of varying engagement levels has also been noted in empirical research. For example, Blumenfeld et al. (1991) found that while PBL fosters high engagement for many students, those with prior experience in similar activities may not experience the same cognitive shifts. This aligns with Houda's experience and highlights the importance of designing PBL tasks that are appropriately challenging and differentiated to meet the diverse needs and backgrounds of students. A one-size-fits-all approach can limit the learning outcomes for those who are already familiar with the project-based format.

Unequal participation in group work is a well-documented limitation of PBL. A study by Feller and Feller (2013) found that group dynamics often result in some students taking on more responsibility, which can impede the full participation and learning of all group members. This finding aligns with your observation that certain students carried more of the workload than others, reducing the collaborative benefits of the approach. This challenge underscores the need for carefully structured group tasks and clear accountability measures to ensure equal contribution from all students.

These studies reinforce the importance of addressing these limitations in PBL, such as by providing better time-management resources, differentiating tasks to ensure they are challenging for all students, and improving the structure of group work to promote equal participation.

5. Conclusion

The findings of this study indicate that PBL an effective pedagogical strategy for promoting the development of both critical thinking and essential soft skills. Through activities centered on inquiry, collaboration, and problem-solving, PBL allowed students to engage deeply with real-world problems, leading to significant improvements in their critical thinking, creativity, communication, and self-regulation. Although challenges such as time management and varying levels of student engagement were observed, the overall impact of PBL was highly positive. By encouraging students to actively apply their cognitive skills in meaningful, authentic contexts, PBL not only supported their academic progress but also helped them acquire valuable skills essential for their future professional lives. Going forward, addressing issues such as time management and ensuring equitable participation in group work can further enhance the effectiveness of PBL in educational environments.

While this study offers important insights, it also highlights certain limitations that future research should address. By focusing exclusively on students' perceptions of their critical thinking development and the reflections of the teacher-researcher on PBL implementation, the study provides a nuanced understanding of the learning experiences associated with PBL. However, future research could benefit from employing an experimental design that incorporates pre-tests and post-tests to examine the specific types of critical thinking skills fostered by PBL and to what extent they are developed. In addition, combining qualitative and quantitative approaches in a mixed-methods design would provide a more comprehensive understanding of the impact of PBL.

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