Project-Based Learning in a Language Learning Media Course: Integrating Technology, Language Proficiency, and Multidisciplinary Skills

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Abstract

In the context of the 21st century, prospective teachers are required to be able to develop and implement creative language learning media as well as integrate higher order thinking skills with technology. Thus, equipping future teachers with the competencies to design and implement creative language learning media is imperative. Project-Based Learning (PjBL) is a recognized pedagogical approach that fills the need for collaborative, creative, and critical thinking and also facilitates language learning. Grounded on Dewey's progressivism and TPACK theories, this study aimed to explore how PjBL was applied in Language Learning Media course and investigate students' perceptions of their learning experience. This project was conducted as a descriptive case study at an English Education Department of a University in Indonesia. The data was collected from classroom observations and semi-structured interviews with six students taking Language Learning Media course. Describe thematically, the analysis of the data illustrates how PjBL promoted authentic engagement with technology, and provided students a meaningful way to use English while they created instructional media. Students reported that they perceived PjBL as motivating, applicable, and relevant to their future careers, however, they also encountered challenges including time management and uneven student contribution. This study not only adds to the research on PjBL in teacher education but it illustrates how PjBL may be able to integrate language skills and technology skills. It also can inform teacher educators on creating a reflective, and student-centered course of study.

Keywords:
Project-Based Learning, Language Learning Media, Case Study, Student Perspectives, and Teacher Education

1. Introduction

The educational landscape of the 21st century is changing quickly, which has influenced what we look for in teacher education programs. Globalization, the digital transformation of societies, and more complexity in the labor market have produced expectations that future teachers should prepare their learners to develop higher order thinking, digital literacy, and intercultural communicative skills (Falloon, 2020). However, many of the traditional teacher-centered pedagogies may not be able to meet these expectations, as teacher-centered programs tend to focus more on transmitting content rather than promoting active, creative, and collaborative practices. As a result, increased interest in innovative approaches to teacher preparation, which seem to not only prepare pre-service teachers to use language, but also conceptualize technology-integrated opportunities for their learners to cultivate multidisciplinary and twenty-first century skills has developed. One example of pedagogy is Project-Based Learning (PjBL), which centrally positions students' learning in authentic problem-based tasks that incorporate language, technology, and collaboration skills into the authentic tasks.

PjBL has been defined as an instructional method in which students engage in extended, complex projects that culminate in a tangible product or performance (Krajcik & Blumenfeld, 2005). Unlike conventional task-based learning, which often compartmentalizes language skills, PjBL situates language as a tool for communication, problem-solving, and content production (Jaleniauskiene & Venckiene, 2025). This form of pedagogy is especially relevant to teacher education classes like Language Learning Media, where pre-service teachers must develop the ability to design and use digital pedagogical tools. In that case, PjBL provides a distinctive opportunity to practice English, test technology, and innovate pedagogically at the same time, thus connecting the realities of twenty-first century classrooms to these new pedagogical approaches - using, digital competencies and collaborative problem-solving creating an indispensable part of effective language teaching.

A growing body of evidence supports the advantages of Project-Based Learning (PjBL) in contexts of language learning and teacher education. For example, Sah, et al. (2024) shared that the benefits of PjBL improved students' critical thinking, creativity, collaboration, and digital literacy during an English as a Foreign Language (EFL) course. In addition, Benlaghrissi and Ouahidi, (2024) demonstrated that, as part of a PjBL activity, a mobile app and web-based platform complimented learners' grammar, vocabulary, and oral communication skills. Such findings aligned with and added credibility to Undari et al. (2023) literature review on PjBL studies which highlighted overall creativity, problem solving, collaboration, and communication benefits in relation to current priorities in education. Outcomes from the PjBL projects are not only short-term learning outcomes; PjBL activities also encourage transferability skills in their students, which are all part of the expected professional competencies of the profession for future educators.

Furthermore, PjBL has made claims as a potent modality for the purpose of multidisciplinary integration, not only in language education. Multidisciplinary skills refer to the capacity to work across disciplines and integrate knowledge/modes of thinking to create better explanations, solutions, or products than a single discipline can provide (Spelt et al., 2009). Nasution and Setyaningrum (2024) state that PjBL projects in higher education provide circumstances for students to participate and utilize their STEM knowledges and innovate practice when contextualizing abstract knowledges to the real contexts of the PjBL projects. Ibrahim's (2025) bibliographic study drew the conclusion that PjBL is coming of age in vocational education and in STEM fields in the studies that were included in the bibliographic study - although it does not encourage much dialogue, beyond an inclusive framing of PjBL, or the longer-term consequences of PjBL in higher education contexts, and specifically, to technology, language and pedagogy, as an area of study in academia. This reinforces the idea that PjBL can create a bridge between multidisciplinary skills, when students create degrees of holistic competencies rather than only content, or linguistic or technical competencies.

Even with this promise, research has demonstrated some limitations. First, many studies analyze language acquisition, technology usage, and multidisciplinary collaboration as separate outcomes of learning, rather than as integrated aspects of learning. There is little empirical evidence that detailed descriptions of integration tracked a similar PjBL approach. Secondly, PjBL was shown to increase student motivation and engagement, but there is very limited evidence regarding the impact of PjBL preparing students for future teaching positions in the field (Zhang & Yan, 2023; Ibrahim, 2025). Third, as digital technology capability is usually embedded within PjBL, the use of technology to mediate interaction, creative process, and use of language is not clearly described or examined (Benlaghrissi & Ouahidi, 2024). Although these gaps present areas for future research, they also represent opportunities to focus inquiry on a convergence practice of PjBL as an integrated approach to innovate the dimensionalities of 21st century transformative, bottom-up teacher education in a language, technology, and collaborative contexts.

From a theoretical perspective, PjBL is grounded by a solid base of educational philosophies and models. PjBL is grounded in Dewey's (1920) notion of learning by doing and Kilpatrick's project method, which focused on meaningful activities related to student agency, collaboration, and problem solving. Vygotsky's (1978) social constructivism gives more support and emphasizes learning as socially mediated and learning within the Zone of Proximal Development (ZPD) acts as support for student development. In PjBL, students negotiate meaning, share the workload, and reflect with each other which embraces Vygotsky. Just like Kolb's (2012) experiential learning cycle is embedded in the iterative work associated with PjBL, the cycle involves concrete experience, reflective observation,

abstract conceptualization, and active experimentation. In the digital age, new theoretical perspectives further support the pedagogical justification for PjBL. Siemens (2005) and Downes (2010) argue that learning is the capacity to navigate and construct networks of knowledge, tools, and communities, especially throughout PjBL projects where students are required to utilize web-based platforms, collaborative software, or communities of practice, allowing co-learning to take place. Similarly, technologically pedagogical content knowledge (TPACK) (Koehler et al., 2013) draws attention to the interaction of content knowledge (language), pedagogical knowledge (iPad PjBL approaches), and technological knowledge (digital tools). In a media based PjBL context, the students must continuously work at integrating these elements in order to design and produce effective learning materials for the instruction. Finally, perspectives from Computer Supported Collaborative Learning (CSCL) (Stahl et al., 2014) also draw attention to the mediating role of technology on interaction and knowledge construction, therefore, providing an important lens for examining PjBL tasks that involve shared production in a digital environment. Together, the three different theoretical traditions provide a coherent rationale for situating PjBL as an approach that develops language learning, technology literacy, and skills development across multiple disciplines.

Despite numerous studies recognizing the advantages of PjBL in language education, some patterns suggest areas for further investigation. For instance, Rohmah et al. (2024) found via systematic analysis that PjBL promotes communicative competence and learner autonomy in EFL contexts, but the majority of studies still favor isolated skills such as writing or speaking. Oka et al. (2024) concluded that PjBL does build confidence and participation, but the studies generally did not address confidence and participation specifically through the development of technological or media production skills. In addition, although Suryani et al. (2024) and Devi Ariningsih et al. (2021) reported that digital PjBL enhanced experiential learning and writing creativity, there is limited research on how PjBL projects involving media design can simultaneously enhance linguistic, technical, and pedagogical knowledge. Rehman et al. (2023) and Dias-Oliveira et al. (2024)) confirmed the effectiveness of PjBL in developing 21st-century skills such as collaboration and problem-solving. However, finding how these skills unfold in language-and-technology-linked involvement is limited. Although motivation is consistently reported as one of the beneficial elements of PjBL (Safaruddin et al., 2020; Zhang & Yan, 2023), the relationship between PjBL, motivation, and measurable academic achievement remains unclear.

In combination, these findings highlight several important deficits. First, in studies, language skills, technology use, and the 21st century skills have been reported in isolation rather than jointly as collective outcomes of PjBL. Second, while PjBL is documented as effective in teacher preparation programs, courses which prioritize media design have yet to engage PjBL process within 21st-century pedagogies, although it could effectively prepare teachers for contextually-designed instruction in digitally-facilitated classrooms. Third, research has not focused (and rarely frame pre-service teachers' experiences) on theoretical models such as TPACK or CSCL when engaging PjBL in EFL contexts, and so the connection, and impact, of connecting these models with PjBL for integrated language event remains unaddressed. Addressing these limitations within PjBL initiatives is timely for teacher education to develop global competencies in preparation to adapt and develop practices that prepare teachers to engage in 21st-century pedagogies that think through innovative, local-designed, technology rich instruction.

Considering these gaps, the current study explores the role of Project-Based Learning in a Language Learning Media course intended for pre-service English teachers. More specifically, it aims to answer: in what ways do Project-Based Learning facilitate students' engagement with English, technology integration, and collaborative and creative skill development? This study explores PjBL in multiple theoretical perspectives (i.e. progressivism, social constructivism, experiential learning, connectivism, TPACK and CSCL) to show PjBL is a whole pedagogical approach that can contribute to linguistic, technological and interdisciplinary objectives.

The study provides multiple contributions to the field. Theoretically, it reconceptualizes PjBL as both a language learning tool but also as a combined schema of technology and 21st century skills represented through a cohesive model. Empirically, it provides evidence from a descriptive case study of pre-service teachers, outlining both possibilities and concerns related to implementing media based PjBL activities. Pedagogically, it outlines implications for teacher educators and curriculum designers that are looking to modernize teacher preparation programs in consideration of 21st century teaching

realities found in digital, multilingual and collaborative classrooms. Overall, the study contributes to the ongoing conversation regarding how these novel pedagogies can prepare future teachers for 21st century education through reflective, creative and technological skills.

2. Method

The present study employed a descriptive qualitative case study design to explore the implementation of Project-Based Learning (PjBL) in Language Learning Media course and to examine students' attitudes toward the learning process. A case study design was considered appropriate because it allows for in-depth observation of teaching and learning practices within a bounded setting and facilitates the exploration of participants' experiences as they naturally occur in context (Yin, 2018). The study took place in a course provided by the English Education Department of a private university in Central Java, Indonesia. All students enrolled in the course engaged with project-based activities as part of their coursework. Although the classroom activities were conducted as part of the normal course of study, voluntary consent was obtained from students who were willing to be interviewed semi-structured interviews. There are six students participated in this study through purposeful sampling with inclusion taking Language Learning Media course and voluntary willing to join. To ensure integrity of the research the confidentiality and anonymity of participants was maintained throughout the study.

Data were gathered from two main data-gathering strategies: classroom observations and semi-structured interview. Observations and semi-structured interviews were conducted by six English Education students taking Language Learning Media course in academic year of 2024/2025. Observations were conducted on a regular basis throughout the semester to examine student engagement, collaboration with peers, engagement with project work in english, and the role of digital tools in project work. Observations provided an in-the-moment snapshot of how students interacted with one another, with the teacher, and with the tasks. Towards the end of the semester, students who volunteered were interviewed using semi-structured interviews to capture their perspectives of project-based learning (PjBL) as well as their perceived benefits and challenges, and general reflections on the overall learning experience. The observations and interviews captured different aspects of how the teaching and learning unfolded in the course, and allowed the researcher to create a fuller picture of the teaching and learning that happened in the classroom, while also validating the data collected.

The project unfolded within a 16-week semester of academic year of 2024/2025 according to the principles of PjBL. In the first 4 weeks, students were introduced to the PjBL framework and then invited to work in small groups to prepare the project. Each group was asked to design and create new digital media for language learning within 8 weeks and the processed was observed. Throughout the process, students collaborated extensively, utilized technology, and employed their language abilities in real-life situations. The observation was focused on peer collaboration, meaning negotiation, creative problem-solving, and possible digital tool use. The project took place in phases: planning, design, development, classroom sharing, and final reflection. The classroom sharing was conducted in the last 4 weeks to piloting the media in the classroom setting followed with final reflection. Following the final presentations, interviews were conducted to elicit students' reflections about their significance of learning and the potential value of PjBL in preparing them as future teachers.

Data analysis followed the thematic analysis approach as described by Braun and Clarke (2006), which provides a systematic process of recognizing, analyzing and reporting themes in qualitative research. Analysis began with reading the observation notes and interview transcripts closely to become familiar with the data. Pieces of text were coded according to their initial meanings and reconstructed into overarching categories based on more abstract issues on the repeated themes evident in the data, such as language use, technology use, collaboration/teamwork, student motivation, and hurdles that arose. Codes and categories were revisited with several iterations of coding, analysis and checking to ensure coherence and credibility. Across this recursive process, key themes were produced that captured student experiences with PjBL. To enhance the trustworthiness of findings, triangulation was invoked in part by checking observations from the classroom with student accounts in the interviews, ensuring that observations and interpretations were corroborated with evidence. Member checking was also one way of triangulation as findings were presented to selected student participants so they could confirm the analysis of the findings was accurate and, when needed, clarify or expand on their experience. These procedures were conducted to strengthen the trustworthiness of the study with the ultimate goal of

ensuring that the analysis conveyed student voices and experiences.

Overall, the methodology offered a rich, context-sensitive understanding of how PjBL was enacted in the Language Learning Media course, and how students understood its effect on their learning. When combining observations of classroom practice with participant reflections the study provided detailed insights into PjBL accommodating student engagement with language use, technology, collaboration, and creativity in teacher education.

3. Results and Discussion
3.1 Results

The research examined students' perspectives of Project-Based Learning (PjBL) in a Language Learning Media class, utilizing semi-structured interviews and classroom observations. Findings are reported thematically in order to represent students' experiences through language use, technology-enhanced learning, collaboration, student engagement, student motivation, challenges, and the connection of PjBL to skills across disciplines.

Figure 1

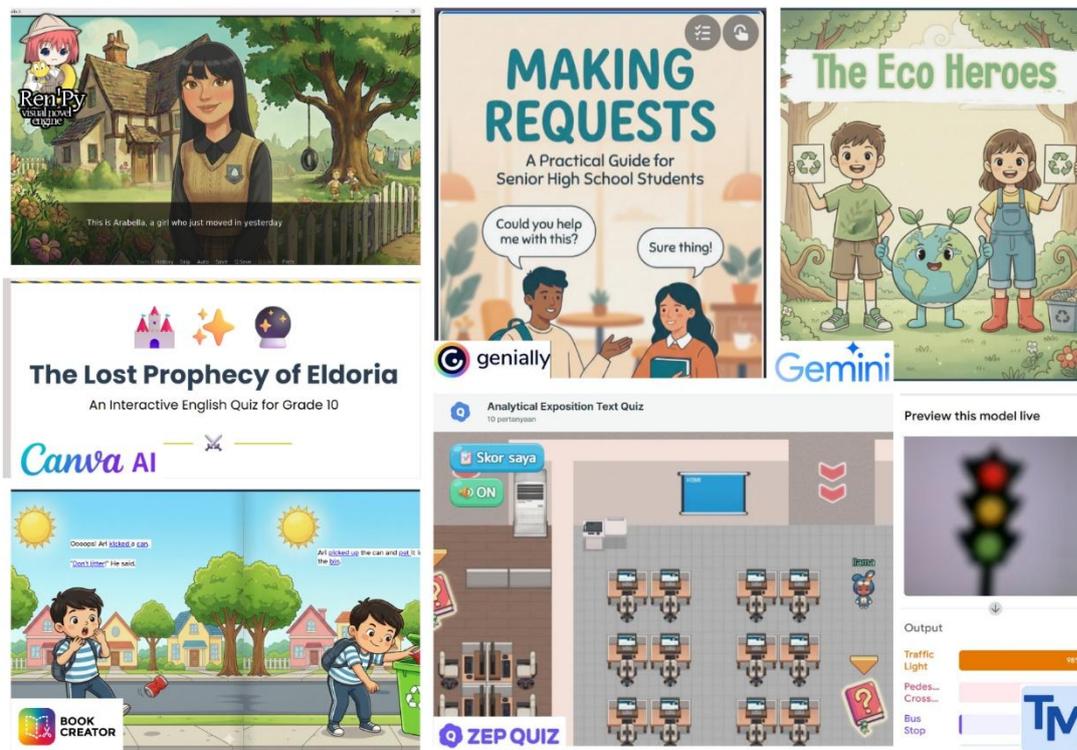*Example of Students' Products on Language Learning Media Project*

Table 1

Summary of Interview Findings

Theme	A	E	Fr	P	S	F
Language Use	"I often saw English in materials … it helped me use English more."	"The project forced me to actively use English for communication."	"The project pushed me to use English more actively."	"Most communication was in Indonesian/Javanese."	"Encouraged me to use English in writing and media content."	"This project enhanced my confidence in real-life English use."
Media Creation	"Confused at first but happy	"Challenging but rewarding…	"Challenging but enjoyable; I	"Creating a visual novel was fun and valuable."	"I learned to design attractive	"Fun and challenging… I designed

	"to make simple media.".	required creativity and pedagogy."	learned to be creative."		and useful media.".	interactive videos/animations."
Technology Integration	"We used Canva, PPT, Google Classroom, WhatsApp."	"Technology was essential… design software, video editors."	"Technology made design and presentation easier."	"90% of work used tech… ChatGPT helped with ideas."	"I used design software, resources, platforms."	"I used Teachable Machine for interactive media."
Motivation	"Motivated because I could practice directly.".	"Responsibility to team pushed me to learn."	"Curious to explore new ideas."	"Driven by final exam requirement."	"Responsible for producing something real.".	"Saw real-world application… it engaged me."
Collaboration	"We divided tasks based on skills."	"We divided tasks by strengths and helped each other."	"I learned to listen and respect perspectives."	"Uncooperative peers required clear instructions."	"We divided tasks equally and effectively."	"We divided tasks and communicated well."
Challenges	"Main challenge was time and schedules."	"Challenges: time management and coordination."	"Balancing time and opinions were hard."	"Uncooperative peers, time limits, tech costs."	"Managing time and balancing ideas was hard."	"Time management and technical issues with Teachable Machine."
Relevance	"As a teacher, I need to create interesting media."	"This project is very relevant for teaching.".	"Very relevant, I will design my own media."	"Relevant for understanding student challenges."	"Prepared me to design teaching media."	"Highly relevant… I developed media design skills.".

3.1.1 Language Use

The observation data indicated that English was used intermittently during the group discussion phase, with most interaction occurring in Indonesian or Javanese. However, English use became more consistent and purposeful in product-oriented stages: students used English when writing scripts, preparing voiceovers, and delivering the final presentations. This pattern was also echoed in the interview data. Several students perceived that the PjBL setting pushed them to use English more actively, which contributed to greater confidence and communicative engagement. For example, one participant stated, "The project forced me to actively use English for communication." In contrast, P highlighted a different experience, explaining that the dominance of local languages during collaboration reduced the project's contribution to his spoken English development, as "most communication was in Indonesian/Javanese." These findings suggest that while PjBL created meaningful opportunities for English use in task outcomes, its impact on oral interaction during collaboration remained uneven and was shaped by students' language choices within group dynamics.

3.1.2 Media Creation and Technology Integration

The observation data showed that all groups successfully produced innovative instructional products, including animations, visual novels, and interactive videos, indicating that the project moved beyond routine assignments into tangible media development. This was consistent with students' narratives in the interviews. For instance, participant A reported an initial period of uncertainty but eventually felt capable of producing usable learning media, stating, "Confused at first but happy to make simple media." In addition, participant F demonstrated more advanced experimentation by integrating Teachable Machine to design interactive media, suggesting that the project enabled creative risk-taking

and exploration of emerging tools. Across groups, observations also confirmed frequent use of common platforms (e.g., design and communication tools) throughout planning, production, and presentation stages. Students further emphasized that technology was not merely supportive but essential for completing the project effectively, enhancing coordination, creativity, and efficiency. As one student expressed, "Technology was essential… design software, video editors."

3.1.3 Collaboration and Teamwork

The observation data indicated that collaboration was central to the project process. Most groups distributed roles based on members' strengths, typically separating responsibilities for design, writing, and editing, and observation notes further suggested that task allocation was generally equitable and functional. The interview data supported this pattern, as students described teamwork as a key feature of their PjBL experience and emphasized the value of interaction and shared responsibility. For example, participant E highlighted the importance of collaboration by noting, "We divided tasks by strengths and helped each other." At the same time, both observational and interview evidence revealed challenges in group dynamics. Some groups experienced uneven participation, and in one case, a member attempted to dominate decision-making. This was reflected in P's narrative, who reported that "Uncooperative peers required clear instructions," expressing frustration when a group member did not cooperate.

3.1.4 Engagement and Motivation

The observation data suggested that the authentic and product-oriented nature of the project encouraged students' engagement. In particular, observations recorded visible enthusiasm during the presentation stage, indicating that students were invested in showcasing their work. The interview findings aligned with this pattern. Several students explained that motivation emerged from a strong sense of accountability to teammates, which pushed them to contribute consistently. For example, one participant noted, "Responsibility to team pushed me to learn." Others (e.g., E and S) emphasized that the project felt meaningful because it connected to real-world teaching practice, making the learning experience more relevant and engaging.

3.1.5 Challenges

Interview data indicated that students faced recurring challenges related to time management, workload, and technical constraints throughout the project. Most participants described difficulty coordinating schedules and completing tasks within the available timeframe, often noting that the limited duration affected both the process and the final quality of the product. For example, participant A stated, "Main challenge was time and schedules." Several students explicitly suggested that the project would benefit from a longer timeline to allow for deeper development and refinement. Although students reported that they could reflect on feedback received during the project, they also emphasized that limited time reduced opportunities to implement revisions, meaning that product improvement was often constrained by deadlines rather than willingness to improve.

3.1.6 Relevance to Future Careers

Interview data showed that all participants perceived the project as highly relevant to their future careers, particularly in preparing them for teaching practice. Several students emphasized that designing instructional media is a core professional competence for prospective English teachers. For instance, participant A explicitly linked the project to classroom needs, stating, "As a teacher, I need to create interesting media." Similarly, S and others highlighted that the experience strengthened their readiness to develop engaging materials for learners. Participants also described more specific professional insights gained from the project. P valued the opportunity to better understand the difficulties learners may face during learning tasks, while F emphasized how the project supported preparation for technology-rich instruction, noting that it was "highly relevant… I developed media design skills."

3.1.7 Overall Perceptions of PjBL

Interview data showed that students generally viewed PjBL as useful and worth the effort, particularly for linking theory to practice, fostering creativity, and enabling collaboration. However, perceptions of its impact on oral English were mixed. Some students (e.g., E and S) reported increased confidence, noting that "this project enhanced my confidence in real-life English use." Others suggested that PjBL mainly offered additional opportunities to practice speaking rather than producing major improvement.

3.2 Discussion

The study indicated that through Project-Based Learning (PjBL) instructional format in a Language Learning Media course, it allows for meaningful chances for students to improve their English language proficiency, engage with technology, develop 21st century skills and become prepared for the profession. At the same time, challenges such as uneven participation, limited time, and reliance on local languages persisted. These results can be analyzed through the lens of constructivist, experiential, and technology-integrated learning theories, as well as recent empirical studies.

3.2.1 PjBL and Language Development

While students used English inconsistently throughout informal group discussions, they used the language readily when presenting and writing scripts and constructing media. This is consistent with Vygotsky's (1978) notion of socially mediated learning that is, learning that occurs when students interact in the Zone of Proximal Development (ZPD) and then experience gradual improvement. A, for example, said that when she was exposed to English materials, she was able to use it more and more, "little by little," while E suggested that "the project forced me to actively use English for communication." These examples parallel the findings of Rohmah et al. (2024) and Oka et al. (2024) who found that PjBL is helpful for developing students' communicative competence and confidence in learning. P's use of Indonesian/Javanese also suggests that, without structured scaffolding, L1 will dominate over the language and inhibit the potential for PjBL to develop oral languages.

3.2.2 Technology and Media Integration

Technology was a central element to the projects' success. Students used tools like Canva, CapCut, Google Slides, ChatGPT, and Teachable Machine. F's use of machine-learning based media demonstrates how PjBL encourages learners to stretch beyond traditional tools of technology as suggested in the TPACK framework (Mishra & Koehler, 2006). The researcher found that learners articulated their creativity through their products in multiple forms, such as visual novels and animations. Overall, these educational experiences provide evidence in support of Benlaghrissi and Ouahidi (2024), and their claim to support linguistic and creativity abilities through digital PjBL intervention. Most importantly, they illustrate how technology in PjBL engages students not only for English use but also for preparation in professional teaching related to digital contexts, in response to Ibrahim's (2025) suggestion of integrated pedagogy in higher education contexts.

3.2.3 Collaboration and 21st-Century Skills

A prominent part of the experience was collaboration. Students appreciated collaborative work, problem solving, and learning from fellow students, which aligned with Vygotsky's (1978) social collaborative principles of learning as well as CSCL perspectives (Stahl et al., 2014). For example, Fr and S described learning to listen and respect the opinions of their classmates. This example parallels the reflective and conceptualization processes in Kolb's (1984) experiential learning cycle. On the other hand, the challenge of unequal contribution as noted by P, provides space for better facilitation of participation. The contributions by Fr and S and P mirror the suggestions put forward by Dias-Oliveira et al. (2024) that multidisciplinary PjBL experiences enhance teamwork and problem-solving, as well as the contributions from Rehman (2023) who emphasized agreeing to disagree in team work.

3.2.3 Motivation and Professional Readiness

Students' motivation derived primarily from the authenticity of the tasks presented to them, as well as a sense of duty to the peer group. E pointed out that she wanted to help since her group needed help, and S pointed out that this project showed how English could operate creatively. These comments resonate with reported motivation benefits of PjBL noted by Yang (2020), although what P required to motivate him, a course requirement, supported Zhang & Yan (2023) that PjBL is motivating to students but unlikely, as he noted, to result in academic achievement that can be measured. Most importantly, the project provided students with a sense of professional readiness: A and S discussed learning how to create the media, while P said he developed diagnostic skills in response to student needs. This aligns with Undari et al., (2023) review that PjBL helps develop transferable professional skills.

3.2.4 Challenges and Improvement Needs

Students invariably noted time pressure, technical issues, and unequal participation as barriers. Observations verified that while students would reflect on feedback, they had limited time to engage in meaningful revision. These obstacles have been consistent with observations in Ibrahim (2025) when

they said that PjBL in the classroom context lacks sustainability. Students' requests for more clarity and time indicate a need to manage learning between open-ended inquiry and structured scaffolding.

3.2.5 PjBL and Multidisciplinary Skill Development

The study's paramount conclusion is how PjBL brought together multiple areas of learning. Students participated seriously in language-based learning (writing and speaking in English), learning through a technology lens (digital design, video editing, machine learning tools), and pedagogical innovation (creating effective teaching resources). These three learning areas meant students had to operate across disciplinary domains. In the process, they developed not only linguistic and digital competencies but also transferable skills, including working collaboratively, sensitivity to creativity, and problem-solving. Take F, for example, whose group produced a project that included developing a video with Teachable Machine (ICT/AI knowledge), writing scripted dialogues in English (language knowledge), and a developing a sophisticated digital resource that could be used in class (pedagogical knowledge). The ways students worked across multiple domains of learning supports Falloon's (2020) assertion that PjBL can act as space that applies interdisciplinary knowledge; moreover, this incorporates Ibrahim's (2025) suggestion that language, technology and pedagogy is a worthwhile area for inquiry in higher education. Theoretically, Kolb & Kolb (2012) experiential learning cycle and Siemens' (2005) connectivism substantiate the ways in which students' learning was mediated through authentic tasks situated in networks that crossed domains of learning. Furthermore, by producing digital media in English for educational purposes, students demonstrated a construct of multilingual competence that addresses the needs of the classroom of twenty-first century.

3.2.6 Implications

This study carries important implications for theory, pedagogy, and policy. Theoretically, it confirms that Project-Based Learning (PjBL) should be viewed as an integrative framework rather than a method confined to language improvement. It confirms constructivist, experiential, and connectivism views—and pushes TPACK and CSCL models further into teacher education contexts. From a pedagogical perspective, this study indicates that teachers will need to negotiate openness and structure in their implementation of PjBL. The students in this study enjoyed authentic, creative work, but struggled with time management, participation, and use of English. To address these issues, teachers should scaffold consistent English use in both formal products and peer collaboration, provide clear task distribution and timelines, and integrate technology meaningfully to enhance creativity and collaboration rather than using it superficially. In addition, guided reflection should be embedded so that students can connect their project experiences with wider learning objectives. Teachers can maximize the benefits of PjBL as an effective pedagogical tool for language development, digital literacy and transferable professional skills when embedding authenticity and technology, along with structured scaffolding.

From a policy-based view, the findings demonstrate the need for greater embedding of PjBL as a 'core pedagogy' within teacher education programs. Support for teacher educators from a policy perspective would include access to the digital infrastructure, pedagogical training in technology-mediated pedagogy and a curriculum structure that more predominantly incorporates authentic, project-based approaches that meet the needs of twenty first century education.

In sum, the implications of this study position PjBL as a multidimensional framework that can strengthen prospective EFL teachers' language engagement, digital creativity, and collaborative competence when it is deliberately structured and well-supported. Notably, technology enhanced creativity and efficiency but did not automatically increase English interaction, suggesting that meaningful L2 talk in PjBL requires explicit interactional scaffolding rather than digital integration alone.

4. Conclusion

The purpose of this study was to investigate how Project-Based Learning (PjBL) in a Language Learning Media course helps bring together language skills, technological capabilities, and interdisciplinary skills as part of a teacher education program. The results show that PjBL acts as a comprehensive pedagogical stance for learning a language, not just a technique for fostering language use, that places English use within real tasks, mediated through technologies and engaged collaboratively and interdisciplinarity. Student experiences highlight that through planning, delivering,

and creating media, they were trying out English use in purposeful ways, while also experiencing technologies and a kind and level of problem-based pedagogy in practice. The findings support the conclusion that PjBL went beyond discrete competencies and established equitable opportunities to prepare pre-service teachers to use communication, innovate with technology, and design a collaborative interdisciplinary approach.

The findings further suggest that PjBL develops transferable competencies such as teamwork, creativity and reflective practice that have a bearing on their professional preparedness. While motivation differed at the individual level, the nature of projects was authentic and collaborative, which contributed to students' consistent engagement, supports the view that PjBL meets the needs of twenty-first century classrooms. The study then is successful in answering the research questions in that it demonstrated that PjBL is effective in facilitating language learning and developing students with the technological and multidisciplinary capabilities associated with current teaching needs.

Nonetheless, this research is bounded by certain limitations. This research involved a single course at a single private university, with a relatively small number of students, which limits generalizability. Furthermore, although the data capture students' perspectives and classroom practice, the study did not measure sustained impacts on the professional teaching performance of the participants or evaluate language proficiency outcomes in a systematic way. Further studies could alleviate these limits by engaging in longitudinal research, and a mixed methods standpoint provides opportunities to gather both quantitative and qualitative data and to study the issue across different institutions or cultural contexts. Further research could also investigate some potential approaches for sustaining English language use, and scaffolding equitable participation in collaborative group work projects. Overall PjBL is an excellent way to rethink the teacher education landscape by integrating and weaving together language, technology and multidimensional competencies into one holistic construct. It will be essential to consider broader and deeper research to bolster the effectiveness of PjBL and its potential for transformation.

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