

PRE-SERVICE ENGLISH TEACHERS' DIGITAL PEDAGOGY DEVELOPMENT THROUGH PROJECT-BASED LEARNING IN TEFL CLASSROOMS

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ABSTRACT

This qualitative descriptive study investigates how Project-Based Learning (PjBL) supports pre-service English teachers' digital pedagogy development in a TEFL classroom. Although previous studies have examined technology integration and digital competence in teacher education, limited attention has been given to how pre-service teachers develop pedagogical reasoning while designing digital English teaching media through project-based experiences. This study involved 20 sixth-semester students in the English Education Study Program, Faculty of Education and Literature, Universitas Bosowa, Indonesia. Data were collected through classroom observations, semi-structured interviews, reflective journals, and documentation of students' digital teaching media projects. The data were analyzed using thematic analysis to identify patterns related to learning experiences, digital media development, collaboration, reflection, and challenges. The findings reveal that PjBL functioned as a bridge between TEFL theory and teaching practice by encouraging students to transform pedagogical concepts into meaningful digital learning resources. The project supported the development of pedagogical creativity, technology-informed instructional decision-making, collaboration, and reflective awareness as future English teachers. The findings also indicate that students gradually shifted from focusing on digital tools as products toward understanding technology as a means to achieve learning objectives. However, students experienced challenges related to technical skills, pedagogical alignment, and time management. The study contributes to TEFL teacher education by demonstrating how PjBL can foster digital pedagogy development through the integration of theory, practice, technology, and reflection. Practically, the findings suggest that TEFL lecturers should provide structured guidance, feedback, and reflective activities to help pre-service teachers design pedagogically meaningful digital teaching media.

Keywords: Digital Pedagogy, Digital Teaching Media, Pre-Service English Teachers, Project-Based Learning, TEFL

INTRODUCTION

Teaching English as a Foreign Language (TEFL) plays an important role in English teacher education because it prepares pre-service teachers to transform theoretical

knowledge into instructional decisions, teaching materials, classroom activities, and assessment practices. In EFL contexts such as Indonesia, TEFL courses in English teacher education are expected to prepare pre-service teachers not only to understand teaching theories but also to apply pedagogical knowledge in designing instructional materials and classroom practices. In the current digital learning environment, this responsibility has expanded because future English teachers need to integrate technology with pedagogical and content knowledge rather than simply use digital tools.

The need to strengthen TEFL courses has become more urgent in the current digital learning environment. English teachers are increasingly expected to design technology-enhanced learning resources, use digital platforms, create interactive teaching media, and integrate digital tools into classroom activities. Digital English teaching media such as Canva-based materials, interactive PowerPoint slides, Quizizz, Wordwall, digital flashcards, short teaching videos, digital worksheets, and learning management system materials can support language learning when they are pedagogically aligned with learning objectives and student needs. However, technology integration in TEFL should not be understood merely as the ability to operate digital tools. It requires the ability to connect technological knowledge, pedagogical reasoning, English language content, and learner engagement (Falloon, 2020; Spante et al., 2018). This is consistent with the TPACK perspective, which emphasizes the meaningful interaction among technological, pedagogical, and content knowledge in teaching practice (Koehler et al., 2013; Mishra & Koehler, 2006; Pehlevan & Unal, 2024; Syamdianita & Cahyono, 2021).

Previous studies have shown that technology integration in English language teaching can support engagement, flexibility, creativity, and access to learning resources, but its effectiveness depends on pedagogical design. Hamid et al. (2025) show that hybrid learning in English for Business requires the integration of technology and pedagogy rather than the simple adoption of digital platforms. Similarly, Hamid, Rahman, et al. (2025) highlight that lecturers' perceptions of hybrid learning are shaped by the balance between instructional flexibility, student engagement, and pedagogical control. These studies suggest that digital technology becomes meaningful when it is supported by clear teaching rationales and appropriate learning models. Therefore, pre-service English teachers must be trained to use technology not only as a visual aid but also as part of instructional design. In TEFL classrooms, this can be achieved by involving students in practical projects that require them to design digital teaching media based on English language teaching principles.

However, previous research has mainly examined technology integration from the perspectives of digital readiness, acceptance, or teachers' perceptions. Less attention has been given to how pre-service teachers develop the ability to make pedagogical decisions when designing digital learning resources. This issue is particularly important in TEFL contexts, where technology selection should be guided by language learning objectives and instructional considerations.

Project-Based Learning is one instructional model that can respond to this need. PjBL emphasizes learning through meaningful projects that require students to investigate a problem, design a product, collaborate with peers, present their work, and reflect on their learning process (Guo et al., 2020; Kokotsaki et al., 2016). In English language teaching, PjBL

is relevant because it allows learners to use language for authentic purposes while developing creativity, collaboration, critical thinking, and communication. Belda-Medina (2021) found that PjBL can support pre-service teachers' attitudes and digital skills in EFL contexts. Rampeng et al. (2025) also show that the integration of Project-Based Learning and deep learning principles can support speaking fluency and critical thinking in EFL learning. These findings indicate that PjBL has strong potential to connect theoretical learning with practical and reflective teaching experiences. Nevertheless, previous studies on PjBL in EFL contexts have mostly focused on students' language learning outcomes rather than its role in developing pre-service teachers' instructional design competence.

Although PjBL has been widely recognized as an effective approach for promoting collaboration, creativity, and active learning, previous studies have often focused on its contribution to students' learning outcomes. In teacher education contexts, limited attention has been given to how PjBL supports pre-service teachers in developing instructional design competence, particularly in creating digital teaching media for TEFL purposes.

Despite the potential of PjBL, many pre-service English teachers still experience difficulties when asked to design digital English teaching media. Some students are able to use digital applications but struggle to connect them with learning objectives, language skills, classroom procedures, and student-centered activities. Others can create visually attractive media but fail to provide clear instructions, meaningful interaction, and appropriate assessment. This condition indicates that digital media development requires more than creativity and technical competence. It requires pedagogical reasoning, TEFL knowledge, understanding of student needs, and awareness of learning models. Research on pre-service teachers' digital learning media development has emphasized that teacher candidates need structured guidance, examples, feedback, and reflective opportunities to develop pedagogically meaningful digital resources (Fauziah & Kalisa, 2025; Kulaksız, 2023; Limbong et al., 2024).

Several studies have investigated digital competence, TPACK, technology integration, and Project-Based Learning in teacher education. However, important gaps remain in understanding how these elements are connected within TEFL classroom practices. First, previous studies on digital competence have mainly focused on teachers' technological skills, readiness, or perceptions toward technology use, while less attention has been given to the process through which pre-service teachers develop pedagogical reasoning when designing digital teaching resources. Second, although Project-Based Learning has been widely studied in EFL contexts, previous research has largely emphasized students' language learning outcomes, engagement, or skill development rather than its role in preparing future teachers to design pedagogically meaningful digital media. Third, limited studies have explored how TEFL concepts, instructional models, and digital tools are integrated through a classroom-based project.

These gaps are significant because designing effective digital English teaching media requires more than technical ability. Pre-service teachers need to understand how technological tools can be aligned with learning objectives, language content, teaching strategies, and learner needs. Therefore, this study addresses the gap by exploring pre-service English teachers' experiences in designing digital English teaching media through

Project-Based Learning in a TEFL classroom. The study contributes to the field by providing insights into students' pedagogical decision-making processes, reflections, and challenges during digital media development.

This study is also significant in the context of Universitas Bosowa, particularly in the English Education Study Program, Faculty of Education and Literature. As future English teachers, students in this program need learning experiences that help them connect TEFL theory with practical classroom innovation. The inclusion of Project-Based Learning in the TEFL course provides an opportunity for students to develop teaching products that are relevant to current digital learning demands. This is in line with the broader development of EFL instructional models in Indonesian higher education, where instructional clarity, student engagement, academic relevance, and technology integration are increasingly emphasized (Januarty et al., 2025). By focusing on pre-service English teachers' experiences, the present study offers insights into how a TEFL course can be designed to support digital pedagogical competence, reflective practice, and professional readiness.

Based on the background above, this study aims to explore how Project-Based Learning is implemented in a TEFL classroom and how pre-service English teachers experience the process of designing digital English teaching media. The study also examines the challenges students face when integrating TEFL concepts, Project-Based Learning, and digital media development. Theoretically, this study is grounded in Project-Based Learning, TEFL pedagogy, and TPACK-based digital pedagogy. Practically, the findings are expected to help TEFL lecturers design more experiential and technology-oriented learning activities. The study also provides a model for integrating course assignments with article-based academic outputs, where students' classroom projects can become the basis for publishable research in English language teaching.

In English teacher education, pre-service teachers need to develop pedagogical reasoning. Pedagogical reasoning refers to the ability to make instructional decisions based on learning objectives, student characteristics, teaching content, learning models, and available resources. This ability is particularly important in TEFL because English teachers must select teaching strategies that are suitable for foreign language learners. Hamid et al. (2025) argue that EFL instructional models should be aligned with student perceptions, lecturer rationales, academic needs, and institutional contexts. This means that teaching models must not be applied mechanically; they must be selected and adapted based on pedagogical relevance. Therefore, TEFL classrooms should train pre-service teachers to understand not only what to teach but also why and how to teach it.

TEFL courses also need to respond to the development of digital learning. Contemporary English teachers are expected to design digital materials, use online platforms, facilitate technology-mediated interaction, and evaluate digital learning tasks. This expectation requires pre-service teachers to develop digital pedagogical competence. Studies on digital pedagogy in EFL learning indicate that technology integration should be connected to meaningful learning objectives and active student engagement (Le et al., 2021; Syamdianita & Cahyono, 2021; Vongsawath et al., 2025). If digital tools are used without pedagogical awareness, they may only produce attractive but ineffective learning materials.

Therefore, digital media design should be embedded in TEFL courses as a professional learning experience for pre-service English teachers (Izadinia, 2012; Ping et al., 2018).

Project-Based Learning (PjBL) provides a learning environment where pre-service teachers develop teaching products through investigation, collaboration, presentation, and reflection. The use of PjBL in TEFL has strong pedagogical relevance. First, it allows students to experience learning by doing. Instead of only studying theories of teaching methods, students are required to apply those theories in designing teaching products. Second, PjBL creates opportunities for collaboration and peer feedback. Students can discuss ideas, evaluate each other's media, revise their products, and learn from different perspectives (Guo et al., 2020). Third, PjBL supports reflective learning because students are encouraged to evaluate their own process and product. Fourth, PjBL allows students to integrate digital tools into teaching practice. Belda-Medina (2021) found that PjBL can enhance pre-service teachers' digital skills and attitudes toward ICT use in EFL learning. Similarly, studies on project-based digital competence suggest that PjBL supports pre-service teachers' readiness to design technology-enhanced instruction (Kulaksız, 2023; Yuvita et al., 2025).

However, implementing PjBL in TEFL requires careful planning. Students need clear project guidelines, assessment rubrics, examples of good digital teaching media, feedback sessions, and opportunities for revision. Without adequate scaffolding, PjBL may become a product-oriented assignment rather than a meaningful pedagogical experience. Students may focus too much on visual design and ignore learning objectives, language content, teaching procedures, and assessment. This challenge has been noted in studies on pre-service teachers' media development, where students often need support in aligning technological tools with pedagogical and content knowledge (Fauziah & Kalisa, 2025; Pehlevan & Unal, 2024). Therefore, the role of the TEFL lecturer is crucial in guiding students throughout the project process.

Digital English Teaching Media and TPACK-Based Pedagogy

Digital English teaching media refers to technology-based instructional resources designed to support English language learning. These may include Canva-based teaching materials, digital posters, interactive PowerPoint slides, Wordwall activities, Quizizz quizzes, digital flashcards, short learning videos, online worksheets, and LMS-based resources (Falloo, 2020; Golonka et al., 2012). Digital media can support the teaching of listening, speaking, reading, writing, vocabulary, grammar, and pronunciation when designed appropriately. For example, Wordwall can support vocabulary practice, Quizizz can be used for formative assessment, Canva can be used for reading visuals and writing prompts, and short videos can support listening and speaking activities (Shin et al., 2020). However, media effectiveness depends on whether the tools are aligned with learning objectives, student needs, classroom procedures, and assessment.

The development of digital teaching media requires TPACK-based pedagogical awareness. TPACK emphasizes the integration of technological knowledge, pedagogical knowledge, and content knowledge. In TEFL, this means that pre-service English teachers should understand the English content being taught, the teaching model used, and the digital tool that can support the learning process. A digital tool should not determine the pedagogy;

rather, pedagogical goals should guide the selection and use of digital tools. Syamdianita & Cahyono (2021) found that EFL pre-service teachers faced challenges in designing teaching materials because they had to connect technology, pedagogy, and content in one product. Pehlevan & Unal (2024) also show that digital literacy and TPACK are closely related in pre-service English teacher education. These studies emphasize that digital competence must be developed through authentic and guided teaching tasks.

Digital media development is also closely related to professional identity formation. When pre-service teachers design digital media, they begin to think like teachers. They make decisions about what students need, what objectives should be achieved, what activities are meaningful, and how learning should be evaluated. This process allows them to move from being students to becoming teacher candidates with pedagogical responsibility. Research on digital technology integration by Indonesian pre-service EFL teachers shows that teacher candidates need more opportunities to practice integrating technology into actual teaching contexts (Limbong et al., 2024; Silitonga et al., 2025). Therefore, digital media projects in TEFL classrooms can support both digital competence and professional teacher development.

Although previous studies have examined PjBL, digital competence, and technology integration in teacher education, important gaps remain. Many studies focus on technological skills, readiness, or perceptions, while fewer studies explore how pre-service teachers develop pedagogical decision-making through digital media design. Furthermore, PjBL research in EFL contexts has largely emphasized language learning outcomes rather than teacher development. Therefore, this study investigates how pre-service English teachers experience the process of designing digital English teaching media through Project-Based Learning in a TEFL classroom.

The conceptual framework of this study integrates three main concepts: TEFL, Project-Based Learning, and TPACK-based digital pedagogy. TEFL provides the disciplinary foundation because the project requires students to design media for English language teaching. Project-Based Learning provides the instructional model because students learn through the development of a meaningful product. TPACK-based digital pedagogy provides the analytical lens because students must integrate technology, pedagogy, and English language content. These three concepts are interconnected. TEFL defines the teaching context, PjBL structures the learning process, and TPACK explains the knowledge integration required to design effective digital media. Through this framework, the study examines how pre-service English teachers experience the process of designing digital English teaching media in a TEFL classroom.

Based on the gap and objectives above, this study was guided by the following research questions: (1) How is Project-Based Learning implemented in the TEFL classroom? (2) How do pre-service English teachers experience the process of designing digital English teaching media through Project-Based Learning? (3) What challenges do pre-service English teachers face in integrating TEFL concepts, Project-Based Learning, and digital teaching media development?

METHODS

This study employed a qualitative descriptive design. This design was selected because the study aimed to explore pre-service English teachers' experiences, perceptions, challenges, and reflections during the process of designing digital English teaching media through Project-Based Learning. Qualitative descriptive research is appropriate for educational studies that seek to present participants' experiences in a rich and context-sensitive manner. It allows researchers to understand classroom processes, student interactions, project development, and reflective responses without reducing them to numerical variables (Doyle et al., 2020; Kim et al., 2016). Since this study focused on a TEFL classroom, the qualitative design enabled the researcher to examine the implementation of Project-Based Learning holistically. This design was appropriate because the study did not aim to measure the effectiveness of Project-Based Learning statistically but to understand how participants experienced, interpreted, and reflected on the process of designing digital teaching media within a TEFL learning context.

Research Setting and Participants

The study was conducted in the English Education Study Program, Faculty of Education and Literature, Universitas Bosowa, Makassar, Indonesia. The research was situated in a TEFL course taken by sixth-semester undergraduate students during one academic semester. The course was selected as the research setting because it provided a learning context where students were required to apply TEFL theories, teaching models, and digital pedagogy concepts through the development of digital English teaching media. Through the Project-Based Learning activity, students experienced the process of planning, designing, presenting, and revising teaching media as part of their teacher preparation.

The study participants were 20 sixth-semester undergraduate students enrolled in a TEFL course. They were selected using a purposive sampling method because they had direct experience participating in Project-Based Learning activities and designing digital English language teaching media. Researchers can purposefully choose participants with pertinent experiences connected to the research phenomenon by using purposeful sampling (Palinkas et al., 2015). Selection criteria included: (1) officially enrolled in a TEFL course, (2) actively participating in project activities, (3) producing digital teaching media products, (4) completing a reflective journal, and (5) being willing to participate in interviews. Before data collection, the researcher explained the purpose of the study, the research procedures, and the participants' rights. Participation was voluntary, and confidentiality was maintained by using participant codes (P1–P20) instead of real names.

Project-Based Learning Procedure

The Project-Based Learning procedure was implemented over one semester (approximately 14–16 weeks) as part of the TEFL course activities. The procedure consisted of five stages: planning, designing, developing, presenting, and reflecting. In the planning stage, the instructor introduced TEFL concepts, digital pedagogy, and the role of instructional media in English language learning. Students discussed their target language

skills, learning objectives, intended learners, and appropriate teaching approaches as the foundation for developing digital instructional media.

In the designing and developing stages, students identified specific teaching focuses, including vocabulary, grammar, speaking, reading, writing, listening, or pronunciation, and selected digital platforms or tools that aligned with their instructional objectives. The selected tools included Canva, PowerPoint, Wordwall, Quizizz, CapCut, Google Forms, and LMS-based materials. However, the selection of digital tools was guided by pedagogical considerations, such as learning objectives, student needs, classroom activities, and assessment purposes, rather than technological features alone. Students then developed digital English instructional media, prepared teaching scenarios, designed learning activities, and revised their products based on peer and instructor feedback.

In the presenting and reflecting stages, students presented their digital teaching materials and explained the relationship between the selected tools, teaching approaches, and learning objectives. Feedback from peers and the instructor was provided to support improvement and refinement of the products. After revision, students completed reflective journals focusing on their learning experiences, challenges, and understanding of digital pedagogy. This process allowed students to evaluate their development as future English teachers and reflect on how Project-Based Learning supported the integration of TEFL knowledge, pedagogy, and technology.

Data Collection Techniques

Data were collected through classroom observation, semi-structured interviews, reflective journals, and documentation. In qualitative research, using a variety of data sources is advised since it enables researchers to acquire more nuanced interpretations and bolster the validity of findings through triangulation (Creswell & Poth, 2018). Classroom observation was conducted to examine students' participation, collaboration, interaction during project development, use of digital tools, responses to feedback, and revision processes. The observation activities were guided by an observation protocol focusing on students' engagement in the Project-Based Learning stages, decision-making during media development, and interactions with peers and the instructor.

Semi-structured interviews were conducted to explore students' experiences, perceptions, challenges, and reflections regarding the Project-Based Learning process. The interview questions focused on participants' experiences during the project, difficulties encountered in designing digital teaching media, decision-making processes in selecting and applying digital tools, and reflections on how the project influenced their understanding of TEFL and digital teaching practices (Kallio et al., 2016).

Reflective journals were used to capture students' personal learning experiences after completing the project. The reflective journal prompts guided students to reflect on their learning process, difficulties faced during media development, pedagogical considerations in designing teaching materials, technological challenges, and possible improvements for their future teaching practices as prospective English teachers.

Documentation included students' digital media products, lesson plans, teaching scenarios, screenshots of digital tools, presentation slides, and project feedback forms. The

combination of these data sources enabled data triangulation and provided a comprehensive understanding of pre-service teachers' experiences in designing digital English teaching media through Project-Based Learning.

Data Analysis

The data were analyzed using thematic analysis as proposed by (Braun & Clarke, 2021). The analysis process began with familiarization, in which the researcher repeatedly read interview transcripts, observation notes, reflective journals, and project documentation to gain an overall understanding of the participants' experiences. The coding process was conducted systematically. First, meaningful statements related to the research questions were identified and assigned initial codes related to TEFL understanding, digital media development, collaboration, creativity, challenges, and reflection. Second, related codes were compared and grouped into broader categories that represented patterns across the data sources. Third, potential themes were reviewed by examining their consistency with the collected data and the research objectives. Finally, themes were defined and named based on their relationship with TEFL, Project-Based Learning, and TPACK-based digital pedagogy. This process resulted in themes that represented students' experiences, learning processes, and challenges during digital teaching media development.

Trustworthiness and Ethical Considerations

To ensure trustworthiness, this study applied triangulation, member checking, peer debriefing, and an audit trail. These techniques are frequently employed in qualitative research to improve the process's transparency, reliability, trustworthiness, and confirmability (Nowell et al., 2017). Triangulation was conducted by comparing information obtained from interviews, classroom observations, reflective journals, and project documentation to ensure consistency across data sources. Member checking was conducted by sharing the interpretation of interview responses and preliminary findings with selected participants to confirm whether the interpretations accurately represented their experiences. Peer debriefing involved discussions with a fellow researcher regarding coding decisions, theme development, and interpretation processes to reduce researcher bias. An audit trail was maintained by documenting the research procedures, coding processes, theme development, and analytical decisions. Ethical considerations were maintained by informing participants about the purpose of the study, ensuring voluntary participation, protecting participants' identities, and using the data only for academic purposes (Korstjens & Moser, 2018).

RESULTS

Project-Based Learning Helped Students Understand TEFL More Practically

The first theme emerged from recurring patterns identified across interviews, reflective journals, and classroom observations, showing that Project-Based Learning supported students in transforming TEFL knowledge from theoretical understanding into practical pedagogical decision-making. Before participating in the project, several students perceived TEFL mainly as a course concerned with teaching theories, methods, and

classroom strategies. However, the process of designing digital English teaching media required them to consider learning objectives, learner characteristics, teaching activities, and assessment, which gradually changed their understanding of TEFL as an integrated teaching practice.

One participant explained that the project changed her understanding of TEFL from theoretical knowledge into practical decision-making:

"Before doing this project, I thought TEFL was mostly about theories and teaching methods. However, when I had to design digital teaching media, I realized that TEFL is also about making practical decisions, such as choosing the right activity, selecting suitable materials, and thinking about how students will learn from the media." (P1)

Similarly, another participant emphasized that the project made him understand the complexity of English teaching:

"The project helped me understand that being an English teacher is not only about explaining materials in front of the class. I had to think about the learning objective, the students' level, the media design, and the classroom activity. It made TEFL feel more real and practical." (P4)

These findings indicate that PjBL functioned as a bridge between theoretical knowledge and professional practice. Rather than learning TEFL concepts separately, students experienced how teaching decisions are interconnected. This suggests that project-based experiences can support the development of pedagogical reasoning among pre-service English teachers.

Students Developed Creativity in Designing Digital English Teaching Media

The second theme emerged from students' descriptions of their design processes, reflective journals, and project products, indicating that Project-Based Learning supported the development of both creative and pedagogical thinking. The participants demonstrated creativity not only through the visual aspects of digital media design but also through their ability to consider how digital resources could support meaningful English learning activities.

During the project, students explored different digital platforms to develop teaching materials that supported various language skills. However, the findings indicate that students' understanding of creativity gradually changed throughout the process. At the beginning, some participants associated creativity mainly with attractive designs, visual elements, and interactive features. Through feedback and revision, they began to recognize that effective digital media should also consider instructional clarity, learning objectives, student characteristics, and opportunities for language practice. One participant stated:

"When designing the media, I tried to make it attractive by using pictures, colors, and interactive exercises. At first, I only focused on making the media beautiful, but later I understood that the media also had to help students practice English meaningfully." (P6)

Another participant explained how digital platforms helped her design more engaging vocabulary learning:

"I used Canva and Wordwall for my project because I wanted the students to learn vocabulary more interestingly. Through this project, I learned that digital media can make English learning more fun, but the content must still be clear and related to the lesson."
(P9)

These findings suggest that students' creativity developed from surface-level design skills toward pedagogical creativity. The project encouraged students to move beyond creating visually attractive materials and consider how digital media could facilitate language learning. This shift indicates the development of digital pedagogical awareness among pre-service English teachers.

Students Connected TEFL Concepts, Learning Models, and Digital Pedagogy

The third theme emerged from interview data, classroom observations, and students' digital media products, showing that Project-Based Learning encouraged students to integrate TEFL concepts, instructional models, and digital technology. The process of designing teaching media required students to justify not only what digital tools they used but also why those tools were appropriate for particular learning objectives and language skills.

The findings indicate that students gradually developed an understanding that technology should not determine teaching practice. Instead, pedagogical goals should guide the selection and use of digital tools. For example, students designing speaking materials incorporated communicative activities, while students developing reading materials included activities that supported comprehension processes. This demonstrates that students began to connect theoretical knowledge from TEFL courses with practical instructional decisions. One participant stated:

"This project made me connect what I learned in TEFL with digital media. For example, when I designed speaking media, I used role play because I remembered that speaking activities should give students opportunities to communicate. So, I did not only make media, but also thought about the teaching method behind it." (P11)

Another participant emphasized that digital tools must be chosen based on teaching purposes:

"I learned that technology should not be used only because it looks modern. The digital tool must support the teaching purpose. If the objective is to improve speaking, then the media should give students chances to speak, not only answer multiple-choice questions."
(P13)

These findings reflect the development of TPACK-based understanding among pre-service teachers. Students began to recognize that effective technology integration requires the interaction of technological knowledge, pedagogical knowledge, and content knowledge.

Thus, Project-Based Learning supported a movement from tool-oriented thinking toward pedagogy-oriented digital media design.

Students Experienced Collaboration, Feedback, and Reflective Learning

The fourth theme emerged from classroom observations, interview data, reflective journals, and project documentation, indicating that collaboration, feedback, and reflection were important components of the Project-Based Learning process. The findings show that students experienced digital teaching media development as a collaborative learning process rather than an individual task. Through group work, students exchanged ideas, shared technical skills, discussed pedagogical decisions, and negotiated the design of their teaching products.

During the project, students worked collaboratively to discuss ideas, divide responsibilities, design digital media, prepare presentations, and revise their products. The collaboration process allowed students with different strengths to contribute to the project. Some students were more confident in using digital applications and technology-related aspects, while others contributed stronger understanding of English teaching content, learning activities, and instructional planning. Through this interaction, students learned from each other and developed a broader understanding of how digital teaching media should be designed.

One participant explained that group work allowed students to combine different strengths:

"Working in a group helped me because my friends had different ideas and digital skills. Some of us were good at designing, while others were better at organizing the teaching steps. We discussed many times before deciding on the final media." (P15)

The findings also show that peer and instructor feedback became an important part of the revision process. Feedback helped students identify weaknesses in their digital media, particularly related to unclear instructions, inappropriate activities, or the connection between media and learning objectives. Rather than viewing feedback as evaluation only, students used it as an opportunity to improve the quality and pedagogical value of their products. Another participant stated that feedback helped the group revise their media:

"After presenting our media, we received feedback from our friends and the lecturer. The feedback helped us realize that some instructions were not clear enough. We revised the media and learned that teaching materials need to be improved before they are used in class." (P17)

In addition to collaboration and feedback, reflection played an important role in students' professional development. After presenting and revising their digital media, students wrote reflective journals describing their learning experiences, difficulties, and future improvements. Through reflection, students became more aware that designing digital teaching media requires careful planning, creativity, technological skills, and pedagogical considerations. One participant reflected:

"Writing the reflection made me think about what I had learned from the project. I realized that designing digital teaching media takes time and careful planning. It also made me more aware that teachers need to be creative but still focused on the learning goals." (P20)

These findings suggest that Project-Based Learning created a learning environment that supported collaboration, feedback, and reflective practice. The project not only resulted in digital teaching products but also encouraged students to evaluate their own learning processes and develop professional awareness as future English teachers.

Students Faced Technical, Pedagogical, and Time Management Challenges

The fifth theme emerged from interview data, classroom observations, reflective journals, and project documentation, revealing that students experienced several challenges during the process of designing digital English teaching media through Project-Based Learning. These challenges were related to technical skills, pedagogical alignment, and time management. However, the findings indicate that these difficulties were not merely obstacles but also became important learning experiences that encouraged students to develop greater awareness of the complexity of digital teaching media design.

The first challenge was related to technical aspects. Some students experienced difficulties in using unfamiliar digital tools, particularly in designing layouts, editing videos, creating interactive activities, managing digital content, and dealing with technical problems during the development process. Although most students were able to explore digital platforms, they needed time and support to use the tools effectively for instructional purposes rather than only for presentation purposes.

One participant explained that the most difficult part was not the use of digital tools but the connection between media and learning objectives:

"The most difficult part for me was connecting the digital media with the learning objective. I could make the media look interesting, but I was sometimes confused about whether the activity really matched the skill I wanted to teach." (P3)

The second challenge was related to pedagogical decision-making. The findings show that some students initially focused more on the appearance of digital media than on its instructional function. They needed to consider whether the activities, instructions, and learning tasks were appropriate for students' levels and connected to the intended learning outcomes. This indicates that designing digital teaching media requires more than technological ability; it requires the integration of content knowledge, pedagogical understanding, and technological knowledge. Another participant described technical challenges in using digital tools:

"I had some technical problems when using digital tools, especially when editing videos and arranging interactive activities. It took more time than I expected. However, after trying several times and asking my friends, I became more confident in using the tools." (P8)

The third challenge concerned time management. Students reported that developing digital teaching media required considerable time for planning content, selecting appropriate materials, designing the product, revising based on feedback, and preparing presentations. The project process helped students realize that effective teaching media development is a gradual process that requires careful preparation and continuous improvement. Time management was also reported as a significant challenge:

“Time management was a challenge because we had to prepare the content, design the media, revise it, and present it. I learned that making good teaching media cannot be done quickly. It needs planning, teamwork, and feedback.” (P12)

These findings suggest that the challenges experienced by students contributed to their development as future English teachers. Through overcoming technical, pedagogical, and organizational difficulties, students learned that digital teaching media should be evaluated not only based on creativity and technological features but also on its relevance to learning objectives and learner needs. Therefore, Project-Based Learning provided opportunities for students to develop digital pedagogical awareness through continuous practice, feedback, and reflection.

DISCUSSION

The results of this study show that Project-Based Learning (PjBL) can change TEFL instruction from a largely theoretical experience into a more useful and professionally significant learning process. In addition to generating digital teaching materials, PjBL's contribution to this study included giving pre-service English instructors the chance to engage in real-world instructional decision-making. Through the project, students had to think about how learning objectives, language proficiency, instructional methods, media choices, and learner needs relate to one other. The claim that EFL teaching models should strike a balance between theoretical comprehension, practical relevance, student engagement, and innovative learning design is supported by this research (Hamid, Maing, Rampeng, Muhammad, & Sahib, 2025).

Additionally, this research expands on earlier conversations about project-based learning in EFL settings. PjBL can improve students' involvement, creativity, teamwork, and language learning experiences, according to earlier research (Belda-Medina, 2021; Rampeng et al., 2025). The current study, however, emphasizes PjBL's additional contribution, which is its function in enhancing pre-service teachers' proficiency in instructional design. This study demonstrates that PjBL can offer a professional learning environment where aspiring teachers apply pedagogical knowledge, create instructional materials, and consider instructional decisions, despite the fact that prior research frequently concentrated on learning outcomes.

The results also show that students' growth of digital pedagogical competency was aided by the emergence of digital media. The key point is that students learnt how to choose and modify technology according to educational goals, not only how to use digital tools (Falloon, 2020). This result is in line with the TPACK concept put forward by Koehler et al. (2013), which highlights the need for the interaction of content, pedagogical, and

technological knowledge for successful technology integration. Previous research also shows that because digital competence encompasses more than just technical skills, pre-service English teachers frequently have difficulties integrating technology with pedagogy and content (Pehlevan & Unal, 2024; Syamdianita & Cahyono, 2021). Therefore, this study suggests that digital teaching media projects can become meaningful contexts for developing TPACK-based understanding among future English teachers.

The growth of educational inventiveness is another significant aspect. The results show that students' conception of creativity steadily changed from creating aesthetically pleasing media to creating significant language learning opportunities. This result corroborates earlier studies showing that technology-assisted learning becomes successful when digital tools are linked to suitable learning objectives and instructional models rather than being utilized merely as aesthetic elements (Hamid, Rampeng, et al., 2025). Students' abilities to create activities, choose relevant media, and think about how students would engage with the materials displayed creativity in this study. Therefore, rather than being limited to technological or visual innovation, creativity in TEFL digital pedagogy should be seen as deliberate instructional decision-making.

The results pertaining to cooperation, criticism, and introspection emphasize the significance of real-world learning opportunities in teacher preparation. Students shared their technological expertise, instructional design viewpoints, and teaching ideas through group projects and peer review. According to studies (Fauziah & Kalisa, 2025; Kulaksız, 2023; Limbong et al., 2024), pre-service teachers build digital pedagogical competence more successfully when they participate in authentic activities, receive assistance, and engage in reflective learning processes. Because it enabled students to assess both their growth as prospective English teachers and the caliber of their digital output, reflection was especially crucial.

The difficulties found in this study shed more light on how difficult it is to build digital education. Students' struggles to match digital media with learning goals indicate that the process of integrating technology with pedagogical reasoning—rather than just a lack of technical proficiency—was the primary obstacle. This result is in line with studies that highlight the need for rigorous instructional planning and the fact that technology adoption alone cannot accomplish technology integration (Mishra & Koehler, 2006; Pehlevan & Unal, 2024). For students to establish more relevant digital teaching methods, lecturers must offer scaffolding in the form of project guidelines, examples, assessment criteria, and feedback sessions.

The interpretation of the results is also influenced by the study's context. The study, which was carried out in an Indonesian English teacher education setting, illustrates the growing need for aspiring educators to acquire technology-enhanced teaching competency. Students' experiences, however, demonstrate that the development of digital pedagogical competency occurs gradually through practice, reflection, and feedback. This corroborates earlier research that highlights the need for EFL teacher education to give pre-service teachers the chance to incorporate technology into real-world teaching situations rather than educating them digital tools apart from pedagogy (Limbong et al., 2024; Silitonga et al., 2025).

Overall, by showing that Project-Based Learning may function as a framework for combining TEFL knowledge, digital pedagogy, and professional teacher development, this study advances TEFL teacher education. This study focuses on how pre-service English teachers acquire pedagogical reasoning while creating digital teaching materials, in contrast to studies that mainly look at technology readiness or attitudes. The results indicate that in order to prepare prospective instructors for modern English language teaching situations, TEFL programs should include project-based, reflective, and technology-supported learning experiences.

CONCLUSION

This study investigated how pre-service English instructors used Project-Based Learning in a TEFL classroom at Universitas Bosowa to create digital English teaching materials. The study shows that Project-Based Learning integrated teaching practice, digital pedagogy, and TEFL knowledge in a relevant way. This study's primary contribution is that it demonstrates how the creation of digital instructional media can serve as a professional learning process in which pre-service teachers gain reflective awareness, pedagogical decision-making skills, and preparedness for teaching English using technology.

The study comes to the conclusion that PjBL is helpful for developing future teachers' professional competence as well as for creating digital instructional goods. Students gained the ability to assess the connections between learning activities, learner requirements, technology use, and teaching objectives through project-based learning. However, because digital teaching competence is developed via ongoing practice and reflection, the results also show that effective PjBL adoption necessitates sufficient supervision, feedback, and structured assistance.

Pedagogical Implications

The results have a number of ramifications for English teacher education programs and TEFL instructors. First, pre-service teachers should be required to build and assess real teaching products, such as digital teaching materials and technology-assisted learning activities, as part of project-based activities in TEFL courses. Second, in order to employ technology as a pedagogical resource rather than as a technical instrument, digital media development should be connected with TEFL theories, teaching strategies, language proficiency, and learning objectives.

Third, during the project process, instructors should offer scaffolding in the form of explicit instructions, evaluation standards, examples of successful digital teaching resources, peer review sessions, and reflection exercises. Pre-service instructors may initially concentrate on technical or visual aspects of media design before establishing deeper pedagogical considerations, which is why these resources are crucial. In order to educate future English teachers for modern teaching environments, PjBL implementation in TEFL courses should prioritize the integration of technology, pedagogy, and topic understanding.

Limitations and Suggestions for Future Research

This study has a number of shortcomings. First, because the study was limited to a single TEFL classroom at Universitas Bosowa, the results may not be representative of all English teacher education settings. Second, this study did not look at how the created media affected real EFL students in the classroom; instead, it concentrated on the experiences of students during the creation of digital media. Third, although the qualitative design did not quantify changes in digital pedagogical ability, it did offer significant insights into students' learning processes.

In order to look at more general trends in pre-service teacher development, future studies can look into comparable Project-Based Learning implementations in various academic settings and universities. The usefulness of student-made digital media in actual EFL classrooms, the use of mixed-method approaches to gauge improvements in digital pedagogical competence, and the ways in which cutting-edge technologies like AI-supported tools can improve Project-Based Learning in TEFL teacher education are all potential topics for future research.

ACKNOWLEDGMENT

The authors would like to thank the English Education Study Program, Faculty of Education and Literature, Universitas Bosowa, and the pre-service English teachers who participated in the TEFL classroom project. The authors also appreciate the feedback and support provided during the development of this article.

REFERENCES

- Belda-Medina, J. (2021). ICTs and Project-Based Learning (PBL) in EFL: Pre-service Teachers' Attitudes and Digital Skills. *International Journal of Applied Linguistics & English Literature*, 10(1), 63–70. <https://doi.org/10.7575/aiac.ijalel.v.10n.1p.63>
- Braun, V., & Clarke, V. (2021). *Thematic Analysis : A Practical Guide*. SAGE.
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative Inquiry and Research Design Choosing among Five Approaches* (4th ed.). SAGE Publications.
- Doyle, L., McCabe, C., Keogh, B., Brady, A., & McCann, M. (2020). An overview of the qualitative descriptive design within nursing research. *Journal of Research in Nursing : JRN*, 25(5), 443–455. <https://doi.org/10.1177/1744987119880234>
- Falloon, G. (2020). From digital literacy to digital competence: the teacher digital competency (TDC) framework. *Education Tech Research Dev*, 68(3), 2449–2472. <https://doi.org/10.1007/s11423-020-09767-4>
- Fauziah, S., & Kalisa, P. (2025). Understanding Pre-Service Teachers' Perception in Applying Teaching Media: A TPACK-Based Study. *Journal of English Language and Education*, 10(4), 1077–1090. <https://doi.org/10.31004/jele.v10i4.1277>
- Golonka, E. M., Bowles, A. R., Frank, V. M., Dorna, R. L., & Freynik, S. (2012). Technologies for foreign language learning: a review of technology types and their effectiveness.

- Computer Assisted Language Learning*, 1–12.
<https://doi.org/10.1080/09588221.2012.700315>
- Guo, P., Saab, N., Post, L. S., & Admiraal, W. (2020). A review of project-based learning in higher education: Student outcomes and measures. *International Journal of Educational Research*, 102(5), 1–13. <https://doi.org/10.1016/j.ijer.2020.101586>
- Hamid, R. J., Rahman, M. A., Wello, M. B., & Asrifan, A. (2025). Lecturers' perception of Hybrid Learning Model In Teaching English For Business. *Journal of English Language Teaching and Applied Linguistics*, 7(1), 12–18. <https://doi.org/doi.org/10.32996/jetal.2025.7.1.2>
- Hamid, R. J., Rampeng, Maing, R. A., & Asdar. (2025). Bridging Technology and Pedagogy: A Qualitative Study of Deep Learning-Based Hybrid Learning in English for Business. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, 12(2), 394–410. <https://doi.org/10.33394/jo-elt.v12i2.16014>
- Izadinia, M. (2012). A review of research on student teachers' professional identity. *British Educational Research Journal*, 39(4), 1–20. <https://doi.org/10.1080/01411926.2012.679614>
- Januarty, R., Maing, R. A., Rampeng, Muhammad, A. F., & Sahib, N. (2025). Postgraduate EFL instructional models in Indonesia: aligning student perceptions with lecturer rationales. *Cogent Education*, 12(1), 1–19. <https://doi.org/10.1080/2331186X.2025.2590863>
- Kallio, H., Pietilä, A. M., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, 72(12), 2954–2965. <https://doi.org/10.1111/jan.13031>
- Kim, H., Sefcik, J. S., & Bradway, C. (2016). Characteristics of Qualitative Descriptive Studies: A Systematic Review. *Research in Nursing & Health*, 40(1), 23–42. <https://doi.org/10.1002/nur.21768>
- Koehler, M. J., Mishra, P., & Cain, M. W. (2013). What is Technological Pedagogical Content Knowledge (TPACK)? *Journal of Education*, 193(3), 13–19. <https://doi.org/10.1177/002205741319300303>
- Kokotsaki, D., Menzies, V., & Wiggins, A. (2016). Project-based learning: A review of the literature. *Improving Schools*, 19(3), 267–277. <https://doi.org/10.1177/1365480216659733>
- Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *The European Journal of General Practice*, 24(1), 120–124. <https://doi.org/10.1080/13814788.2017.1375092>
- Kulaksız, T. (2023). Praxeological learning approach in the development of pre-service EFL teachers' TPACK and online information-seeking strategies. *Int J Educ Technol High Educ*, 20(1). <https://doi.org/10.1186/s41239-023-00421-6>
- Le, T. N., Allen, B., & Johnson, N. F. (2021). Blended learning: Barriers and drawbacks for

- English language lecturers at Vietnamese universities. *E-Learning and Digital Media*, 19(2), 225–239. <https://doi.org/10.1177/20427530211048235>
- Limbong, E., Setiawan, I., & Hamilton, A. (2024). Bridging the Gap: The Reality of Digital Technology Integration by Indonesian Pre-service EFL Teachers. *Script Journal: Journal of Linguistic and English Teaching*, 9(1), 58–78. <https://doi.org/10.24903/sj.v9i1.1524>
- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. *Teachers College Record*, 108, 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic Analysis: Striving to Meet the Trustworthiness Criteria. *International Journal of Qualitative Methods*, 16(1), 1–13. <https://doi.org/10.1177/1609406917733847>
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, J. P., Duan, N., Hoagwood, K., Angeles, L., & Northwest, K. P. (2015). Purposeful sampling for qualitative data collection and analysis in mixed method implementation research. *Adm Policy Ment Health*, 42(5), 533–544.
- Pehlevan, İ., & Unal, B. (2024). Investigating the Relationship between Digital Literacy and TPACK Levels of Pre-Service English Teachers. *Dil Eğitimi ve Araştırmaları Dergisi*, 10(1), 87–111. <https://doi.org/10.31464/jlere.1432879>
- Ping, C., Schellings, G., & Beijard, D. (2018). Teacher educators' professional learning: A literature review. *Teaching and Teacher Education: An International Journal of Research and Studies*, 75(1), 93–104. <https://doi.org/10.1016/j.tate.2018.06.003>
- Rampeng, R., Januarty, R., Maing, R. A., & Sujariati, S. (2025). Integrating Project-Based Learning and Deep Learning Principles to Foster Speaking Fluency and Critical Thinking in EFL. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, 12(2), 510–520. <https://doi.org/10.33394/jo-elt.v12i2.17578>
- Shin, S., Brush, T. A., & Glazewski, K. D. (2020). Patterns of peer scaffolding in technology-enhanced inquiry classrooms: application of social network analysis. *Educational Technology Research and Development*, 68(5), 231–2350. <https://doi.org/10.1007/s11423-020-09779-0>
- Silitonga, L. M., Suciati, S., Wiyaka, Prastikawati, E. F., & Cholifah, N. (2025). Bridging the Gap: Pre-Service Teachers' Realities of Technology Integration in the Digital Classroom. *Eternal: English Teaching Journal*, 16(2), 510–519. <https://doi.org/10.26877/eternal.v16i2.2363>
- Spante, M., Hashemi, S. S., Lundin, M., & Algers, A. (2018). Digital competence and digital literacy in higher education research: Systematic review of concept use. *Cogent Education*, 5(1), 1–21. <https://doi.org/10.1080/2331186X.2018.1519143>
- Syamdianita, & Cahyono, B. Y. (2021). The EFL pre-service teachers' experiences and

challenges in designing teaching materials using TPACK framework. *Studies in English Language and Education* 2, 8(2), 561–577. <https://doi.org/10.24815/siele.v8i2.19202>

Vongsawath, K., Prasitiwi, Y., & Hidayat, N. (2025). EFL Learners' Reading Comprehension Challenges and Strategies: A Case Study of Champasack University in Laos. *Journal of English Language Teaching and Linguistics*, 10(1), 11–25. <https://doi.org/10.21462/jeltl.v10i1.1495>

Yuvita, Y., Hartono, R., Fitriati, S. W., & Saleh, M. (2025). Bridging Pedagogy and Technology: Project-Based Learning for Digital Competence in EFL Microteaching. *Theory and Practice in Language Studies*, 15(9), 2937–2947. <https://doi.org/10.17507/tpls.1509.15>