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Creating Animated Short Stories with Digital Apps: Project-Based Learning in the EFL Classroom

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Abstract. This study aims to investigate the benefits of implementing project-based learning (PBL) to create short stories using digital apps at the university level. Thirty-nine students from the English Education Department at a university in West Java were purposively selected as participants because they were enrolled in a Digital Storytelling course, making them directly relevant to the study's objectives. They used a digital application to facilitate a project that required them to visualize their narratives as animated videos. This study employed a qualitative case study approach, with data collected through student reflections, observations, and semi-structured interviews. The data were analyzed thematically, following coding, categorization, and interpretation processes to identify recurring themes and patterns in students' experiences. The findings indicate that students improved their listening, speaking, reading, and writing skills while enhancing their communication, teamwork, problem-solving, and technical abilities. Moreover, PBL fostered creativity, critical thinking, and collaborative engagement, creating a positive and supportive learning environment. These findings indicate that the combination of PBL with digital storytelling significantly enhances language proficiency and 21st-century skills while testing institutional support to resolve technical challenges.

Keywords: *Animated Short Story, Digital Apps, EFL Classroom, Project-based Learning*

Introduction

Technological advancements have impacted the way people live, work, and learn in all spheres, including education. From higher education institutions, technological innovations have changed learning and teaching in a drastic way by making it more interactive and meaningful. This view is supported by literature from Apriani, Arsyad, et al. (2022), Fatimah & Santiana (2017), Santiana et al. (2021), and Santiana et al. (2024). Lecturers and students, through technology, can easily access, create, and disseminate knowledge across boundaries, exploring new ways in which learning approaches turn learners who were once passive into active participants. This has been supported by the studies conducted by Muthmainnah et al. (2022) and Searson et al. (2015).

Moreover, technological innovations enhance not only learning outcomes but also class participation and student motivation. Based on English language communications, writing is one of the four vital language skills learned by students. Through writing, students can effectively communicate their ideas in a coherent manner in addition to developing their cognitive skills in organization, memory, and critical thinking (Ila et al., 2024; Silvani et al.,

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2023; Yuyus et al., 2021). With all these, writing is among the most challenging language tasks for EFL learners because it involves higher-level thinking, idea creation, and language accuracy (Marlina et al., 2024; Siekmann et al., 2022).

To overcome these challenges, educators have incorporated writing with Digital Storytelling (DST) in class. In this respect, writing becomes one of the instruments in the process of learning English as a foreign language. DST is a kind of narrative writing that can be built from several components, such as pictures, animation, music, and videos, which permit students to make a multimodal story. It is corroborated by Fatimah et al. (2019), Hamzeh & Hefang (2019), and Sari & Wahyudin (2019). Although the process is complex, DST has proven effective in improving engagement, motivation, and authentic language use in EFL contexts. However, when combined with Project-Based Learning, DST can unleash a whole new level of potential in students because this learning approach is a collaborative and meaningful way to teach students a language (Handayani et al., 2024; Silma et al., 2024).

Project-Based Learning is a learning strategy where students work collaboratively on projects that simulate reality. In language classrooms, PBL helps learners not only develop their listening, speaking, reading, and writing skills but also acquire critical 21st-century competencies such as creativity, critical thinking, collaboration, problem-solving, and digital literacy (Alifatun et al., 2024; Masita, 2022; and Silvani et al., 2025). However, incorporating PBL with technology in learning is not without some challenges. Students may have difficulties with technology tools, collaborating with a team, or using technology in creative storytelling, where teachers have to design projects for linguistic and technology learning goals (Silvani et al., 2023).

Recently, studies have shown the potential of technology integration in EFL classrooms. Research demonstrates that technology-enriched learning environments can improve student motivation, learning achievements, and teamwork among students (Guo et al., 2020; Mei et al., 2021; Sher & Ali, 2023). Among various digital innovations, DST has received considerable attention as it improves language proficiency and supports the development of digital literacy and creativity (Balaman, 2018; Santiana et al., 2021; Theresa, 2022). Likewise, PBL has gained increased attention and recognition in EFL settings because it can promote active learning and authentic language use through meaningful learning tasks (Andini & Rusmini, 2022; Maharsi et al., 2021).

Although these developments have been achieved, a research gap is still present. Most of these studies have focused on DST in improving specific language skills, such as writing and speaking capabilities, or have focused on PBL in a distinct way of teaching. Few studies have delved into comprehending these two distinct methodologies in a systematic integration called Digital Animation Short Stories. This project requires learners to combine writing, speaking, creativity, and technical production. Moreover, very little consideration has been given to comprehending students' perspectives of this learning experience, their struggles with online collaborations, and the effects these struggles have on their linguistic development and 21st-century skills acquisition (Hamzeh & Hefang, 2019; Ila et al., 2024).

The uniqueness of this research resides in using Digital Animation Short Stories as a Project-Based Learning model in developing EFL learners' linguistic skills in all four language domains and increasing their level of creativity, critical thinking, teamwork, problem-solving, and digital literacy. Through an analysis of reflections on learning, observations, and depth interviews, this research will bring forth insights into incorporating Project-Based Learning and DST in higher education, especially in an Indonesian EFL setting.

Theoretical Framework

Previous research has highlighted that using technology enhances students' motivation for their learning and, consequently, their engagement. Projects utilizing technology enable students to access a diverse array of materials necessary for job completion. Consequently, the help teachers provide in terms of advice is often diminished. Furthermore, technology is typically associated with a distinct form of learning,

defined by resolving authentic problems, innovative thinking, independent decision-making, collaboration, completing legitimate tasks, and developing metacognitive processes. Furthermore, students appear to exhibit greater confidence and collaboration when the employed technique incorporates project-based tactics alongside technology and task-oriented learning approaches.

In contemporary society, the significance of technology in daily life is ever escalating. Technology is ubiquitous in shopping, bill payment, social interactions, television viewing, operating large machinery, and cooking. Ultimately, it is not within anyone's purview to voice complaints. Nonetheless, regarding the integration of technology in the classroom, it is incumbent upon educators to evaluate the advantages and disadvantages before instructing pupils to bring all their technological devices to class. While students' utilization should enhance their education, the instructional objectives and associated tasks must take precedence.

In project-based learning, students collaborate on projects to solve real-world problems in authentic activities. PBL results in an integrated curriculum, tailored instruction, different kinds of assessment, authenticity and inquiry, real-world applicability, active participation, and dynamic teacher-student interactions. According to Lindsey, EFL students participating in a practical PBL lesson are dynamically at the center of their learning, asking questions about previously incorrect knowledge, forming relationships within the teaching context, and, most importantly, publicly displaying their beliefs and evidence about the issues at hand. PBL also promotes engaged and happy students because they believe they are learning something meaningful and can solve authentic challenges in group work. PBL must be carefully planned to suit students' goals so that ESL and EFL students can benefit from it. The project's relevance to the student's development, support for student background knowledge, student level, academic and social learning, and assessment are the most important factors to consider when implementing a PBL lesson.

Technology is valuable for enhancing students' writing abilities by employing effective and innovative educational strategies. Project-Based Learning (PBL) is recognized as a highly effective approach for teaching writing across various educational levels, particularly in higher education. PBL is a more efficient strategy than traditional approaches since it helps students adjust to different learning preferences (Masita, 2022). Therefore, it is recommended that pupils should come across a greater variety of learning possibilities. Moreover, using PBL, including technological components in classroom activities, would help create a more dynamic learning environment (Alwasilah, 2019). It improves possibilities for creating high-quality and creative thinking abilities, allows students to work together, and allows access to learning beyond the classroom (Andini & Rusmini, 2022; Maharsi et al., 2021).

The integration of technology components in PBL learning activities can help achieve a dynamic learning process with better opportunities for cooperation among students (Demmanggasa Yultan, 2023). Furthermore, it assists in developing innovative and high-quality thinking capabilities with flexibility in accessing learning outside the classroom (Andini & Rusmini, 2022; Ginting, 2020; Guo et al., 2020). This is because PBL provides a learning activity platform with opportunities for learning in an authentic and interest-driven manner among students, as stated by Silvani et al. (2023) and Wulandari & Ahmad (2020).

Creating digital animated stories can be a meaningful project activity for students (Muthmainnah et al., 2022; Santiana, Santiana, Dede, et al., 2021; Santiana Santiana et al., 2021). Bringing it into the teaching aspect gives students a different experience when learning to write. They can be taught to create stories and develop them by visualizing their stories through multimedia software that produces animated films/animated videos, assisted by digital applications. There are many applications that students can use to support this activity because they can be accessed online and for free, and they allow anyone to create digital animated films. The learning process will be more meaningful through PBL in creating digital short stories. Thus, students can get the opportunity to develop other skills, for example. Multimedia, digital literacy, creativity, even thinking processes, and practice writing skills.

Digital storytelling (DST) is an effective tool for EFL students to enhance their language and literacy skills authentically and meaningfully. It facilitates mastering the four essential language skills required for effective interaction and communication with other English speakers in online and offline contexts, employing digital and multimodal literacy practices through selected digital applications.

Based on the preceding description, an idea evolved to employ technology to assist students in creating short stories in digital animation using applications that students can freely select as part of their PBL activities. This study intends to (1) investigate students' perceptions of PBL activities when developing short stories in digital animation and (2) determine the difficulties encountered by students while carrying out PBL activities when developing Short Stories in the form of Digital Animation.

Material and Method

For this particular research, a case study design was used, which this researcher believes is the most suitable research design because it lends one to conducting thorough, empirical research on a case in a real-world setting. A case study design is very helpful in situations where a case and settings blur together without a distinct boundary. In this study, the case study method facilitates an in-depth examination of the development of Digital Animation Short Stories produced by students as part of a class project in English as a Foreign Language (EFL).

The study took place at a higher education institution in Tasikmalaya City, West Java, with 39 students participating in a class called Digital Storytelling (DST). Purposive sampling was applied in selecting students since they were learners participating in a class intended to blend learning languages with technology in a creative way. Purposive sampling enabled an investigation of students participating in Project-Based Learning in an actual learning setting.

The main tool used in data collection was reflections undertaken by students, complemented by observation and semi-structured interviews to maintain rigor in methodology and a degree of triangulation in the data collected. The indicators constructed were meant to aid in data collection and entailed dimensions such as (1) language abilities (listening, speaking, reading, and writing), (2) teamwork, (3) creativity and critical thinking, (4) problem-solving, (5) information technology skills, and finally, (6) motivation and learning satisfaction.

Such indicators assisted in guiding the whole process of collecting and, consequently, analyzing data with a view to pinpointing themes and patterns emerging among students in digital storytelling. The research used reflective writing, which compelled students to put their thoughts and experiences into writing after completing each project. Further, systematic observations were carried out with a view to measuring students' participation in projects engaged in collaboratively. To validate research findings further, semi-structured interviews were carried out among pre-selected research participants who willingly took part in such an activity. Interviews were meant to furnish additional information concerning students' experiences with PBL projects, especially when creating short stories in digital animation format.

The evaluation of the collected data used a thematic analysis technique (Braun & Clarke, 2006). First, all data from reflections, observation notes, and interview transcripts were carefully read and re-read to gain familiarity. Second, initial codes were generated to represent significant language development, collaboration, creativity, and problem-solving features. Third, these codes were grouped into categories and organized into broader themes. For example, reflections were analysed to identify recurring expressions of language skill improvement and creativity; observation data were coded for indicators of participation, communication, and teamwork; while interviews were examined to capture more profound insights into students' challenges and perceived benefits. Finally, the themes emerging from all three instruments were compared and triangulated to ensure the credibility and trustworthiness of the findings.

Results and Discussion

Results

Students' Perceptions

Increased Language Proficiency

This theme illustrates how the students reported their improvements in English language skills. The undertaken project necessitated the practical application of these skills, leading to the students' enhanced proficiency. Excerpts 1 show the students' statement.

Excerpt 1

P1 : The creation of digital animation projects strengthened my English skills because it involved listening, speaking, reading, and writing.

P5 : … as part of my task in the first project, I was responsible for the script, which significantly honed my writing skills. Of course, other friends, such as those doing voice-over work, improved their speaking skills and reading as well.

P12 : This project motivated me to improve my English, especially in listening and speaking.

Excerpts demonstrate that the students' English language skills, especially those concerning listening, speaking, reading, and writing, were greatly enhanced by the project. This is because the students developed these language skills during practical assignments that required them to apply the language in a somewhat natural environment, such as subtitling, translation, and scripting. All three participants concur that the project has positively impacted their language-learning experience. They think it's an interesting and useful way to practice their English, with an explicit emphasis on speaking. For example, P1 mentioned practical use for all four language skills, thereby suggesting general improvement: P5 notably recognized the development of writing skills through scriptwriting and improving speaking and reading skills among peers who participated in voice-over duties. P12 emphasizes listening and speaking as the significant areas for improvement. This means that the project tasks involved some particular skills like listening to talk, watching videos, or holding conversations. This finding confirms that PBL can significantly enhance language learning through the provision of authentic and challenging contexts for practice. By involving students in a real-world task that demands the use of English in various contexts, the project provided a rich environment for language acquisition. This corresponds with the communicative language learning approach since it encourages using language in order to improve language abilities.

Collaboration and Teamwork

Moreover, it follows from the findings that an integration of Project-Based Learning (hereafter, PBL) into language education corresponds to the main goal of language proficiency enhancement. Student reflections indicate the value of collaboration in PBL. Teamwork not only shared the workload pressure but also facilitated peer learning: students learned from and supported each other in various ways during the project. This experience is illustrated in Excerpt 2.

Excerpt 2

P2 : "Teamwork makes the work easier."

P6 "One of the things I learned from this project-based learning is that it is very fun to work together with a new group and finish the project together."

P14 "My experience, as explained in the creation process of the animation. Communication plays the central role, and teamwork lightens the work."

There was a strong indication of the role played by cooperation and teamwork, which enabled them to complete the assignment. In this regard, it has been clarified that in group work, responsibilities are divided, hence helping one another and thereby effectively managing workload. Co-operation is enshrined at the heart of PBL and fosters key intersocial skills alongside academic learning. P2 succinctly mentioned that teamwork reduces the burden, depicting pragmatic benefits accruing from shared responsibilities. P6 expressed pleasure in working with new group members and the shared effort toward completing the project, underpinning the social and cooperative aspects. P14 reiterated that in dealing with such complex activities, effective communication and teamwork were central. These findings affirm that PBL enhances academic learning and enhances such social competencies as talking effectively in a group, supporting one another, and solving problems together. Such competencies are expected in both academic and future professional settings; thus, they underpin the all-round benefits emanating from collaborative learning.

Technical Skill Development

One of the main benefits of PBL is the development of technical skills. The students who used new digital tools improved not only their language acquisition but also their digital literacy. This is particularly important in today's learning environment, where technology plays an integrated role in learning. Overcoming technical problems enables students to gain more self-confidence and flexibility, as the participants pointed out in excerpt 3.

Excerpt 3

P4 : "I learned to use new applications..."

P9 : "My experience in making this project is that I became more aware that there are many applications I can use to create animations."

P18 : "Creating animations was something very new for me. I was confused at first, but using an animation maker, such as an MMD application, makes it easier, and I found it a bit surprising but also found it fun."

Excerpt 3 highlights an important fact regarding this process, which not only enabled the students to learn a great deal in digital literacy, including learning to use MMD, but also learned to see this work as important and increased their technical skills. Using technology in PBL allows students to develop their digital competency, which is considered very important in today's world. P4 and P9 identified their learning about new applications, thus showing enlargement of their technical repertoires.

However, P18 demonstrated a specific example of understanding in-depth information about animation in terms of using the MMD tool, which indicated a higher level of technical knowledge, although it seemed confusing to him. These findings indicate that PBL can effectively embed digital literacy into the curriculum and prepare students for a technologically advanced environment. Additionally, the problems encountered during this learning process must have refined problem-solving and adaptability, thereby enhancing the instructional value of the project.

Creative and Critical Thinking

This theme explains how the creative and critical thinking skills of the participants were applied in developing their digital short stories. The development of complicated stories, the incorporation of multiple creative ideas from members within a team, and solving challenges related to storytelling and animation techniques are expected.

Excerpt 4

P2 : Writing the story required detailing each scene; even though it was assisted by AI, there were always some ambiguities.

P5 : Each member has different creative ideas, but through this project-based learning, we were taught to understand, appreciate, and combine different creative ideas to produce the desired product together.

P25 : "This project definitely improved my writing capabilities because I had to come up with a story with as engaging a plot as possible."

The development of a digital short story challenged students to think creatively and critically. They had to think about concepts, design intricate stories, and address issues associated with both storytelling and technology. This topic reflects PBL's focus on developing creative and critical thinking in students. Development of a story in line with technology capabilities and overcoming difficulties challenged higher-order thinking. Such skills are transferable outside the language classroom and provide students with the means to solve complex problems in other areas of their lives.

Through the PBL exercises, students are compelled to deliberate on complex problems with no clear-cut solutions, hence developing creative and critical thinking abilities. As far as P2, it seemed to be all about narrative coherence because he emphasized the importance of narrating a story properly and how a lack of clarity can be a problem, despite using artificial intelligence. P5 focused on the need to have a few creative ideas in a team and the need to be mindful of a variety of different perspectives to incorporate them into a single narrative. P25 underlined the importance of creating interesting stories that require careful planning and imaginative ideas. These aspects of the initiative provided an environment in whereby the students could develop higher-order thinking approaches necessary for performance in academics and social problem-solving.

Challenges and Problem Solving

While carrying out this project, some challenges were encountered, such as a lack of familiarity with some animation tools, technology issues, and the complexities involved in conducting a group project. These challenges urged the students to devise tactics for solving the problems and adapting to new instruments and workflows.

Excerpt 5

P1 "It's all new for me, making animations. I was confused about how to arrange each frame, a bit surprised, but also found it fun."

P4 "The creation of digital storytelling is quite complicated in the process, yet it provides valuable learning experiences."

P6 "Through this task, I have learned how to work well in a group and solve problems together.

The quotes from P1, P4, and P6 provide evidence of challenges and benefits of project-based learning, in particular, complex skills like animation and digital storytelling. P1 discusses the novelty and initial bewilderment of working with animations, but finds the experience enjoyable, emphasizing the fascinating nature of learning new abilities. P4 acknowledges the complexities of digital storytelling but views it as a beneficial learning opportunity, implying that the challenge was met with a sense of accomplishment. P6 underscores the value of teamwork and collaborative problem-solving, highlighting how the project improved technical ability and fostered crucial interpersonal skills.

When considered in combination, these factors make it apparent that while these tasks were tedious, they have become a learning experience for all of them. Obstacles are a natural ingredient of PBL; sometimes, this results in significant learning gains. The data suggest that students learned to solve problems both independently and in collaboration with others. Resilience in new tools and working challenges presented in teamwork form an important attribute that problem-based learning inculcates. These experiences will make students stronger and ready to face more complex tasks later.

Satisfaction and Enjoyment

On the completion of this project, students derived a huge amount of personal pleasure and satisfaction. Their daily problems notwithstanding, their successful performance and high-quality end product brought forth feelings of pride and satisfaction. This sense of accomplishment was attributed to the result and the learning and growth they had along the way.

Excerpt 6

P8 : Quite enjoyable and relieving after seeing the results...
P16 : I feel very satisfied with the final result of this project.
P20 : Even though it was difficult, there was a sense of pride after the project was completed.

Among many positive outcomes produced by effective learning experiences, a personal sense of fulfillment ranks high, with evidence showing PBL creates a sense of high achievement in students. Perhaps this instills confidence and motivation in students to reach for more in life. Student investment in PBL, with demonstrated results, adds to a more complete and satisfying learning experience. Much can be learned from statements offered by students P8, P16, and P20 concerning themes of fulfillment and satisfaction after struggles presented in a project have been accomplished. P8 gives an impression of relaxation and content with viewing results, which shows a sense of worthwhile accomplishments in completing the project, with a sense of relief in completing all the hard work and effort put into it. P16 is very happy with his results and feels a personal sense of being a complete individual after overcoming the struggles presented in a project. P20 shows a struggle of overcoming, but primarily resulting in a sense of victory, implying personal struggles were worthwhile. These ideas can be seen to bring out the emotional rewards of tenacity and diligence by showing how conquering obstacles in a project-based learning environment can lead to pride, joy, and fulfillment.

Students' Challenges

Complexity of Software

In this connection, it turned out that the use of animation software during PBL activities was quite burdensome for students due to their steep learning curve. Many tools, like MikuMikuDance (MMD), were unfamiliar and required students to develop new skills. This made the learning process much more complex and added to the pressures, since they had to balance technical learning with the creative demands of project work.

Excerpt 7

P5: We faced problems with the complexity of making animations and found the application to be quite complicated to use.

P13: MMD is quite difficult to use, especially for beginners. We needed a guide to run this application.

From excerpt 7, P13 highlighted that a steep learning curve regarding MikuMikuDance (MMD) was a big issue in hindering student success. Moreover, as expressed in P5, software was described to be "complicated to use," especially for those who have had no prior experience, and thus quite an inaccessible environment. The need to get extra support, such as tutorials, might indicate that students were supposed to invest too much energy in learning some basic skills. Consequently, this confused their energies from the creative aspects of the projects and reduced efficiency by perhaps reducing eagerness about undertaking the task.

Apart from the steep learning curve, students experienced difficulties with the inadequately intuitive interfaces of the animation software. The tools were not designed with ease of use in mind; hence, even basic tasks were hard to carry out. These difficulties in the interface added yet another level of complexity, whereby students had to invest more time in

determining how to achieve simple actions, such as placing characters or changing camera angles, as expressed by P19 in fragment 8.

Excerpt 8

P19: Camera angles and placement of the characters were very sensitive to adjust, which made the animation rather difficult to render.

"When an individual views the project, they can relax and feel content because they realize that all the hard work and efforts in the project have paid off." Such work, which is actually critical in making the animations look professional and polished, was not easy but rather cumbersome. This means that students had to invest more time and energy in learning these very basic functions, detracting from their ability to apply more creative and interesting aspects of the assignment. The difficulty in these basic tasks indicates a lack of user-centered design in this application, which is definitely an important factor in increased frustration with progress.

Device Limitations

Employing technology in PBL also creates some challenges that students face, such as the incompleteness of hardware specifications to run the animation software. Most of the students did not have high-specification devices that could work properly with advanced processing or memory. For this reason, it was hard for them to use the software effectively, reducing their productivity and consequently the quality of their projects, as specifically highlighted in excerpt 9.

Excerpt 9

P7: Not all members in our group possess laptops that can run the animation software smoothly; thus, only one member was able to handle the animation.

P21: We faced frequent lagging due to the limited capacity of our devices. This caused delays and repeated work.

Answers above have demonstrated that a common challenge among students was a lack of device capabilities. P7 explained in Extract 9, ‘Cause if we were to rely on one of our members with a better device, it leads to an unequal allocation of work among other students, where one student will be solely responsible for controlling each animation.’ P21 added that if devices do not have sufficient capabilities, this affects project performance and leads to delays in projects due to constant lagging and crashing of software.

The children were also challenged by technical issues raised by the conflicting nature of the animation software with their devices. Some of these software, such as Plotagon, have specific requirements concerning hardware and operating systems which most students' devices do not support. Such incompatibility exacerbated the challenges faced by students and forced them to adjust their methods in light of these limitations or find solutions.

Excerpt 10

P24: "The Plotagon application did not work well with most of our devices, and thus it became necessary for us to look for another solution."

Excerpt 10 quotes P24 in indicating that incompatibility with existing devices presented a challenge for students. Many could not execute the programs on their personal computers or mobile devices, which drove them to look for other resources or distribute devices among team members. This scenario made the cooperation more difficult since students had to change their calendars to use suitable gadgets or less ideal equipment that would affect the quality of their final product. The need to work within these constraints increased the level of difficulty in doing the work, which, in a way, reduced the efficiency and learning experience.

Internet Connectivity Issues

One of the findings in this research is that many things in a project, including teamwork, sharing files, and using online resources, rely heavily on fast internet access. However, interruptions occurred frequently, which impacted the pace of work such that students were not able to have a continuous workflow.

Excerpt 11
P10: It took us a while to relocate to a spot where a constant internet connection was available, which posed quite an impediment.
P16: Downloading and uploading project files took a considerable time because of poor internet connections.

In excerpt 11, the students stated that a poor internet connection affected them greatly in completing their project work. As P10 had to keep moving from place to place to access a stable internet connection, this cost them a lot of time, which they could have used for conducting project work. P16 added that if file transfer took a long time, it would delay the project members in sharing their work and collaborating with each other in real time.

Another challenge associated with internet connectivity was that students were accustomed to utilizing online resources such as tutorials and forums in order to learn new things and resolve any technological issues they may come across. However, since they were experiencing constant interruptions with their internet connection, using these resources would prove to be an added difficulty in their learning process.

Excerpt 12
P18: Following online tutorials for learning was a challenge because of constant disruptions in the internet connection.

P18's thoughts in Excerpt 12 bring into focus how the uncertainty of internet connection availability affects learning resource access. The challenge of adhering to online tutorial learning because of persistent internet connection disruptions hampered them in gaining sufficient skill and knowledge to operate the software appropriately. In this case, P18's struggles in solving technological issues without proper guidance affected their individual learning pace and the whole group's progress in achieving their learning objective because of relying on internet-based learning resources.

Limited Features and Resources in Software

One problem that most students face during Project-Based Learning tasks is the limited availability of advanced options in animation software. Most of the tools used by students have basic options available for free, but advanced options in functions such as background setting and designing characters are not available for free. Therefore, students either end up looking for different solutions or make do with less creative content.

Excerpt 13
P11: Key features, like backgrounds and character customizations, were only within the scope of a 'paid' version of the tool, which are not accessible for creative choices.
P22: The free version did not have all the important tools, and for scene merging, we had to use different software.

Through the case of excerpt 13, it is evident that both P11 and P22 acknowledged that the restriction to the basic version severely limited the students' creativity. Without being able to leverage essential background and character manipulation tools, they were forced to come up with something less creative or simply take more time to mesh different scenes using other programs. This added more complications to their workflow and usually resulted in inconsistencies in their final output. At the same time, such digital stories seriously suffered in quality and creativity, which made the participants upset and did not let them fully enjoy the learning process.

Besides these limitations in terms of access to other versions with premium features, students also experienced limitations in character and scene options within the software. Such limited options largely impacted the nature of the stories students were allowed to make, and in some cases, students were forced to adjust their plans according to the tools accessible to them.

Excerpt 14

P9: Because the software didn't support animal characters or specific scenes, we needed to change our story several times.

P9 explains how a lack of options for characters and scenes in the software caused huge creative problems for the students. They were forced to keep altering their narrative based on the difficulties in the availability of character and setting selections. This gave them extra work, and they became frustrated because they needed to leave behind or dramatically change their original conceptions. Having to manage such sets of adjustments throughout tended to make the project a matter of handling limitations rather than considering the sets of creative possibilities, and it could reduce the educational value and enjoyment of the learning experience.

Integration and Compatibility Issues

They also encountered a number of problems related to their work with complex software packages to present their digital short stories. Given the limitations of particular applications, they often had to rely on several different tools to achieve their desired outcomes. However, this model raised some issues with respect to compatibility among different components of projects, leading to inconsistent quality and synchronization among different project elements.

Excerpt 15

P15: We had some issues with merging the scenes created in different software, which meant not only a mismatch in video quality but also desynchronization.

Excerpt 15 reveals that P15 stated the measure of complications that arose from the application of different software programs. Combining videos from other programs resulted in fluctuating qualities and synchrony, which affected the quality level a project ought to have. Such hitches were part of projects undertaken by students, which took additional time to resolve incompatibility problems rather than utilizing such time in making compelling stories. Hence, using multiple tools was a necessity because the limitations of specific software created more obstacles and impacted the quality of the digital stories. Another huge challenge for the students was technical errors and bugs in the software. Their animation software would often freeze or crash, especially when trying to render an intensely complicated scene. This disrupted the smoothness in workflow, often leading to lost work due to which the effort had to be repeated over and over again.

Excerpt 16

P20: I have come across other apps many times when rendering animations, and they freeze or crash the application. This makes me have to do a lot of the same tasks over and over, which is a real pain.

The frustrations sprouted from frequent crashes and freezes, causing students to continuously redo their work multiple times, therefore increasing their workload and stress levels. This is further explained by the constant disruption P20 faced in excerpt 16, creating an inability to keep the pace and ultimately delaying project completion. Additionally, repeated revisions of such bugs decreased the concentration on the creative process related to their projects. All these factors combined eventually lowered not just the efficiency but also the enjoyment of the learning experience.

Voiceover and Audio Synchronization Challenges

As great as the level of difficulty students faced when they were supposed to incorporate voice-overs into their digital short stories. The synchronization of voice recordings with lip actions of animated characters is a very specific requirement in this project; it took a lot of time to adjust and sync these voice records with visual elements.

Excerpt 17

P14: Synchronizing voice-overs with the lip movements of some characters proved quite a tedious task.

P14 recognizes that, based on excerpt 17, achieving voice-over synchronization with animations is not an easy task because it requires a multiplicity of takes in order to synchronize them well. This added extra time and workload to the project. The lengthening of the work needed and the patience required indeed tested the students' forbearance. Certainly, such complexity of the task could steal some of the engagement and satisfaction the students might have experienced with the project if they were so focused on the technical functions that worked in the play rather than on creative storytelling.

Last, this study also found that students struggled to maintain high-quality audio throughout their projects. Software limitations, such as restrictions on file sizes and the lack of advanced audio editing tools, made it hard for students to integrate clear, professional-sounding voiceovers and sound effects with their animations.

Excerpt 18

P12: Providing a high-quality audio with a matching animation proved to be a challenge because of software considerations and size issues.

P12 stated in excerpt 18 that maintaining good audio quality was a challenge since this might be problematic depending on the nature of the software available. Being constrained from working with files that were larger in size or of higher audio quality meant a poor output in terms of sound quality, which, in essence, did not support effectiveness and professionalism in digital stories. Such cases would have irritated students and might have lowered their satisfaction level with their finishing products, since good quality audio raises the experience of storytelling. Furthermore, a possible tradeoff in the quality may end up diminishing the forcefulness and clarity of the story itself, which might have an influence on the project's level of success in general.

Discussion

These findings prove that in this class, PBL based on digital storytelling could significantly increase not only language competence, but also collaboration skills, computer competence, creativity, and problem-solving, developing at the same time satisfaction and motivation. However, several difficult situations arose; for example, with complicated animation software, device limitations, internet connectivity, and audio synchronization.

To begin with, developing language proficiency in students can be considered in the light of a new trend of using digital storytelling for incorporating all four language skills. Works such as Morgana (2023) and Fedorenko et al. (2021) confirm the findings from 2015 that narrative-based tasks encourage language learners to use English for real communication rather than mechanical practice.

Besides, according to Rodríguez-Peñarroja (2022), language teaching effectively involves students in communicative tasks with factual purposes, conditions satisfied with PBL, and digital story production. Within the framework of social constructivism (Vygotsky & Cole, 2018), learning is seen as a socially mediated process, and more recent studies (Hafford-Letchfield et al., 2018; Alismail, 2015) stress that collaborative projects foster negotiation of meaning and co-construction of knowledge. Secondly, the results confirm that cooperation and teamwork lie at the heart of PBL. Recent research also underlines the role of collaborative

creativity (Zhou, 2020) in language learning, showing that teamwork stimulates innovation, problem-solving, and deeper engagement with content.

Third, integrating digital storytelling facilitated the development of digital literacy and multimodal competence, which scholars identify as indispensable for 21st-century education (Ribeiro, 2015; García-Peñalvo, 2021). A case in point is EFL learning, in which authentic interaction time is a precious commodity. This aligns with the multiliteracies framework, which stresses that learners must be prepared to design meaning across modes and platforms. By grappling with software features and technical limitations, students strengthened their adaptive expertise—a skill essential for education in the digital age (Thelma et al., 2024; Moustaghfir, 2024; & Hamilton, 2022).

Fourth, the data demonstrate that PBL supported creative and critical thinking. The necessity to develop original narratives, troubleshoot technical problems, and integrate feedback reflects higher-order cognitive processes. These animated stories involved the students in script development and the integration of sound, visuals, and narration to create comprehensive multimodal texts. Although Wilson's revised taxonomy remains relevant today, later works such as Eswaran (2024) and Omelianenko & Artyukhova (2024) have suggested that creativity and critical thinking need to fall within the context of authentic tasks for learners to meet realistic challenges. To that end, this project allowed students to go beyond mere rote learning and engage in meaningful knowledge construction.

Fifth, there were technical issues, but they need not be regarded as failures, but rather as learning opportunities. Teich et al. (2024); Khalil et al. (2024). The latest publications on this aspect underline that the process of confronting technological limitations assists in the enhancement of resilience and self-regulated learning strategies. Students have never shown persistence in overcoming difficulties arising from things like a limited capacity of a device and synchronization problems, which reflects the time taken by Altohami et al. (2022). Technological affordances and teaching in EFL mixed-ability classes during the COVID-19 pandemic. These challenges also highlight the importance of institutional support, as pointed out by recent research on technology integration in higher education (Castro-Guzmán, 2021; Akram et. al., 2021; Thelma et al., 2024), which stresses the need for training, infrastructure, and pedagogical scaffolding.

Finally, the sense of satisfaction and enjoyment reported by students is significant. Theories of positive psychology in SLA (MacIntyre et al., 2019) suggest that enjoyment and engagement are critical affective factors that enhance language learning outcomes. Through the combination of PBL and digital storytelling, a learning platform in class emerged where linguistic acquisition and enhancing learner well-being were possible. Some of the more contemporary studies explicating the significance of PBL in terms of positive affective investment include Xu, Song, and Sah in 2024.

Such results support recent theoretical views highlighting interconnections among language, technology, teamwork, and affect in higher education. Through integrating PBL with digital storytelling, this research work demonstrates how innovative education can foster linguistic proficiency and 21st-century skill mastery. To make technology implementation in PBL work more effectively, it is thus important for educators to look into technology implementation challenges and make proper learning and selection in technology usage. Such an approach will make PBL have a better impact with fewer technological obstacles.

Conclusion

Through this research, the integration of Project-Based Learning with digital storytelling in animated short stories in an English as a Foreign Language setting in higher education institutions has been examined. The results show how learners have advanced their English language skill level in all four domains and attained critical skills in the 21st century in terms of teamwork, digital savvy, problem-solving, creativity, and critical thinking. Furthermore, they were more motivated and enjoyed this learning experience in class, which created a positive, supportive learning environment in class. The important thing in these

results is the fact that PBL with digital technology not only promotes better language proficiency but also engages learners in authentic, multimodal, and collaborative learning tasks, which simulate communication in a realistic manner in everyday life. Moreover, this research describes how learners faced technology issues in terms of complexity, device capabilities, and internet connectivity problems in all these applications. Preparations will be important in solving these issues through technology workshops, simpler apps, or internet improvements to maximize this learning approach in higher education institutions. Furthermore, this research differentiates how this integration in higher education institutions can be applied using digital technology in an EFL class setting when authentic communication in class is considered a priority in everyday life. In addition, by incorporating digital storytelling in PBL, instructors have an important innovation in higher education institutions to improve and promote learners' linguistic abilities, digital savvy, and efficient socio-emotional regulation in a higher education class setting. Future studies can continue this research path by examining larger populations and different class settings in various educational environments and institutions. Additionally, they can investigate this research in different educational settings by taking into consideration different technologies or platform usage to provide more information on which technology is important in dissolving technology issues in learning settings in institutions of higher education to promote initiative, ownership, and engaging learners in PBL with digital storytelling in animated short stories in an EFL setting in institutions of higher education.

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References

Akram, H., Yingxiu, Y., Al-Adwan, A. S., & Alkhalifah, A. (2021). Technology Integration in Higher Education During COVID-19: An Assessment of Online Teaching Competencies through Technological Pedagogical Content Knowledge Model. *Frontiers in Psychology*, *12*, 736522.

Alifatun, N., Eka, S. A., Suyanto, S., Shidqi, H. P. P., & Ahmad, N. (2024). Problem-Based Learning (PBL) Methods Within An Independent Curriculum (A Literature Review). Sintaksis: Publikasi Para Ahli Bahasa Dan Sastra Inggris, 4, 165–174.

Alismail, H. A. (2015). Integrate digital storytelling in education. Journal of Education and Practice, 6(9), 126-129.

Andini, S., & Rusmini, R. (2022). Project-based learning model to promote students' critical and creative thinking skills. Jurnal Pijar Mipa, 17(4), 525–532. https://doi.org/10.29303/jpm.v17i4.3717

Apriani, E., Arsyad, S., Syafryadin, S., Supardan, D., Gusmuliana, P., & Santiana, S. (2022). ICT Platforms for Indonesian EFL Students Viewed from Gender during the COVID-19 Pandemic. *Studies in English Language and Education*, *9*(1), 187–202. https://doi.org/http://dx.doi.org/10.24815/siele.v9i1.21089

Apriani, E., Santiana, S., & Harmi, H. (2022). *Investigating the Role of ICT toward Students' Higher Order Thinking in Writing Skills at the Islamic University*. *14*(2016), 2213–2224. https://doi.org/10.35445/alishlah.v14i1.2260

Balaman, S. (2018). Digital storytelling: A multimodal narrative writing genre. *Journal of Language and Linguistic Studies*, *14*(3), 202–212.

Castro-Guzmán, W. (2021). Challenges of professional development for technology integration in higher education. Cuadernos de Investigación Educativa, 12(2), 82-99.

Demmanggasa Yultan, S. M. K. K. M. B. R. A. A. N. Y. (2023). Digitalisasi Pendidikan Akselerasi Literasi Digital Pelajar Melalui Eksplorasi Teknologi Pendidikan. Community

Development Journal, 4(5), 11158–11167. https://journal.universitaspahlawan.ac.id/index.php/cdj/article/view/22045

Eswaran, U. (2024). Project-based learning: Fostering collaboration, creativity, and critical thinking. In Enhancing education with intelligent systems and data-driven instruction (pp. 23-43). IGI Global Scientific Publishing.

Fatimah, A. S., & Santiana, S. (2017). Teaching in the 21St Century: Students-Teachers' Perceptions of Technology Use in the Classroom. *Script Journal: Journal of Linguistic and English Teaching*, *2*(2), 125. https://doi.org/10.24903/sj.v2i2.132

Fatimah, A. S., Santiana, & Saputra, Y. (2019). Digital Comic: an Innovation of Using Toondoo. *ENGLISH REVIEW: Journal of English Education*, *7*(2), 101–108. https://doi.org/10.25134/erjee.v7i2.1526.Received

Fedorenko, S., Voloshchuk, I., Sharanova, Y., Glinka, N., & Zhurba, K. (2021). Multimodality and digital narrative in teaching a foreign language. Arab World English Journal (AWEJ) Special Issue on CALL, (7).

García-Peñalvo, F. J. (2021). Digital transformation in the universities: implications of the COVID-19 pandemic. Education in the knowledge society (EKS), 22.

Ginting, E. S. (2020). Penerapan Model Pembelajaran Berbasis Proyek (Project Based Learning) Berbantuan Media Gambar Untuk Meningkatkan Kemampuan Menulis Cerita Fantasi. Journal of Education Action Research, 4(2). https://doi.org/10.23887/jear.v4i2.12334

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*(May), 101586. https://doi.org/10.1016/j.ijer.2020.101586

Hafford-Letchfield, T., Dayananda, A., & Collins, D. A. (2018). Digital storytelling for interprofessional collaborative practice to develop quality and service improvements. Social Work Education, 37(6), 804-812.

Hamilton, B. (2022). Integrating technology in the classroom: Tools to meet the needs of every student. International Society for Technology in Education.

Hamzeh, M., & Hefang, C. (2019). *Behavioral Sciences Digital Storytelling in Language Education*. 1–9.

Handayani, R., Abrar, M., Tersta, F. W., & Tri, B. S. (2024). *Lecturer Insights on Implementing Project-Based Learning at Jambi*. https://doi.org/10.23917/kls.v9i2.6936

Ila, A., Abdul, G. M., Anita, A., Eulis, R., & Ulfah, U. (2024). *Technological-Based Application in Writing Instruction: A Model of Project-Based Learning*. *10*(4), 4277–4290.

Khalil, M., Wong, J., Wasson, B., & Paas, F. (2024). Adaptive support for self-regulated learning in digital learning environments. British Journal of Educational Technology, 55(4), 1281-1289.

MacIntyre, P. D., Gregersen, T., & Mercer, S. (2019). Setting an agenda for positive psychology in SLA: Theory, practice, and research. *The Modern Language Journal*, *103*(1), 262-274.

Maharsi, I., Wijayanti, Y. R., & Astari, T. R. (2021). Evaluating the Flipped Classroom Approach in Efl Students' Reading Classes. LLT Journal: A Journal on Language and Language Teaching, 24(1), 92–102. https://doi.org/10.24071/llt.v24i1.2768

Marlina, M., Desi, R. A., & Liana, O. (2024). Enhancing EFL Learners' Writing Skills: Challenges, Strategies, and Pedagogical Insights. *Journal of Educational Studies*, *4*.

Mei, D., Utami, A., Apriani, E., Hidayah, J., & Handrianto, C. (2021). Empowering ICT Potentials in English Language Teaching. *Polingua (Scientific Journal of Linguistics, Literature and Language Education)*, *10*(2), 42–48.

Morgana, V. (2023). Task-Based English Language Teaching in the Digital Age.

Moustaghfir, S., & Brigui, H. (2024). Navigating critical thinking in the digital era: An informative exploration. International Journal of Linguistics, Literature and Translation, 7(1), 137-143.

Muthmainnah, M., Riswanto, R., Santiana, S., Apriani, E., & Syafryadin, S. (2022). *DEVELOPING ELT MATERIALS-ICT BASED AMID COVID-19*. *10*(2), 713–728.

https://doi.org/https://doi.org/10.25134/erjee.v10i2.6331. Received:

Ninla Elmawati Falabiba, Anggaran, W., Mayssara A. Abo Hassanin Supervised, A., Wiyono, B., Ninla Elmawati Falabiba, Zhang, Y. J., Li, Y., & Chen, X. (2014). 済無No Title No Title No Title. In *Paper Knowledge. Toward a Media History of Documents* (Vol. 5, Issue 2).

Omelianenko, O., & Artyukhova, N. (2024). Project-based learning: Theoretical overview and practical implications for local innovation-based development. Economics and Education, 9(1), 35-41.

Ribeiro, S. (2015). Digital storytelling: An integrated approach to language learning for the 21st-century student. Teaching English with technology, 15(2), 39-53.

Rodríguez-Peñarroja, M. (2022). Integrating Project-Based Learning, Task-Based Language Teaching Approach, and YouTube in The ESP Class: A Study on Motivation. Teaching English with Technology, 22(1), 62-81.

Sah, F., Sasikirana, H. N., & Pujiani, T. (2024). The implementation of project-based learning in developing 21st-century skills in the EFL class. *Jadila: Journal of Development and Innovation in Language and Literature Education*, *4*(4), 257-272.

Santiana, Santiana, Dede, S. L., Arini, N. H., Abdul, G. M., & Erizar, E. (2021). An Insight into Anitales Apps Perceived by Digital Storytelling Students. *Proceeding International Conference on Islamic Education "Sustainable Education Transformation in The Disruptive Era" Faculty of Tarbiyah and Teaching Training Universitas Islam Negeri (Uin) Maulana Malik Ibrahim Malang.*, *6*(Vol 6 No 1 (2021): Proceeding of International Conference on Islamic Education (ICEID)), 23–30. http://conferences.uin-malang.ac.id/index.php/icied/article/view/1467

Santiana, Santiana; Silvani, D., & Ruslan. (2021). Optimizing LMS CANVAS for Interactive Online Learning Perceived by the Students. *Journal of English Education and Teaching (JEET)*, *5*(4), 529–543.

Santiana, Santiana, Dede, S. L., Arini, N. H., Muthmainnah, M., Muhammed, G., & Abdul, G. M. (2021). Anitales : A Modern Application Used Perceived by the Students in Digital Story Telling Class. *International Journal of Social Science & Management Studies*, *7*(5), 1–11.

Santiana, Santiana, Margana, M., & Nur, H. P. S. P. (2024). *Students' Attitudes Toward the Use of CANVAS in the EFL Virtual Learning Environment*. *8*(2), 267–290.

Sari, F. M., & Wahyudin, A. Y. (2019). Undergraduate students' perceptions toward blended learning through Instagram in an English for business class. *International Journal of Language Education*, *3*(1), 64–73. https://doi.org/10.26858/ijole.v1i1.7064

Searson, M., Langran, E., & Trumble, J. (n.d.). *Exploring New Horizons: Generative Artificial Intelligence and Teacher Education*.

Sher, M., & Ali, B. (2023). The Impact of Technology Integration on Student Engagement and Achievement in Mathematics Education: A Systematic Review. *International Journal on Integrated Education*, *March*.

Siekmann, L., Parr, J. M., & Busse, V. (2022). Structure and coherence as challenges in composition: A study of assessing less proficient EFL writers' text quality. *Assessing Writing*, *54*(October), 100672. https://doi.org/10.1016/j.asw.2022.100672

Silma, N., Maulida, I., Wulan, A. P., Merawati, J., Hasan, K., Ilmu, F., Malik, U. I. N. M., Malang, I., & Aceh, U. S. (2024). *A comprehensive review of Project-Based Learning (PBL): Unraveling its aims, methodologies, and implications*. *1*(1), 10–19.

Silvani, D., Santiana, S., & Syakira, S. (2025). Unveiling Students' Experience with Project-Based Learning in Higher Education. *TLEMC (Teaching and Learning English in Multicultural Contexts)*, *9*(1).

Silvani, D., Santiana, S., & Syakira, S. (2023). Project-Based Learning in an ESP Class: Voices from Indonesian EFL Students. *Proceedings of Conference on English Language Teaching (CELTI 2023)*, 330–342.

Song, Y. (2024). Assessing the interactions between learning enjoyment, motivation, burnout, and grit in EFL students: a mixed-methods approach. *BMC psychology*, *12*(1), 79

Teich, K., Loock, V. S., & Rummel, N. (2024). Meeting the challenges of continuing education online courses: Can we promote self-regulated learning strategies with adaptive support? British Journal of Educational Technology, 55(4), 1437-1455.

Thelma, C. C., Sain, Z. H., Mpolomoka, D. L., Akpan, W. M., & Davy, M. (2024). Curriculum design for the digital age: Strategies for effective technology integration in higher education. International Journal of Research, 11(07), 185-201.

Theresa, G. (2022). *Does The Use of Digital Storytelling Affect the Self-Efficacy and Writing Ability of Long-Term English Learners?* https://scholarworks.lib.csusb.edu/etd/1387

Vygotsky, L., & Cole, M. (2018). Lev Vygotsky: Learning and social constructivism. Learning Theories for Early YeaWilson, L. O. (2016). Anderson and Krathwohl's revised understanding of the new version of Bloom's taxonomy. The Second Principle, 1(1), 1-8.rs Practice. UK: SAGE Publications Inc, 68-73.

Wilson, L. O. (2016). Anderson and Krathwohl's taxonomy revised understanding of the new version of Bloom's taxonomy. The Second Principle, 1(1), 1-8.

Wulandari, A., & Ahmad, A. (2020). The Effect of Using the Project-Based Learning Method on Students' Writing Skills. Journal of English Language and Education, 5(1), 1–15.

Xu, M., & Li, Y. (2023). Practice of Teaching Creative Writing with Text in a High-quality Context for College Students Based on Predictive Analysis Ability of Big Data. EAI Endorsed Transactions on Scalable Information Systems, 10(6). https://doi.org/10.4108/eetsis.3833

Xu, H. (2024). The role of positive learning emotions in sustaining cognitive motivation for multilingual development. System, 123, 103323.

Yeen-Ju, H. T., Mai, N., Kian, N. T., Jing, K. W., Wen, L. K., & Haw, L. C. (2014). Developing creative and critical thinking skills in an authentic learning environment. Jurnal Teknologi (Sciences & Engineering), 68(2).

Yuyus, S., Arini, N. H., Neni, M., & Nita, S. N. D. (2021). *Students ' Logical Inaccuracy in Writing : SQ3R method of reading as a way to improve, October 2016*. *March*.

Zhou, C. (Ed.). (2020). Introducing Problem-Based Learning (PBL) for Creativity and Innovation in Chinese Universities: Emerging Research and Opportunities: Emerging Research and Opportunities.

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