

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

**DigiPic: A DIGITAL PHOTOGRAPHY E- LEARNING SYSTEM
FOR LPU CAVITE**

An Undergraduate Thesis
Submitted to the Faculty of the
College of Engineering, Computer Studies and Architecture
Lyceum of the Philippines University-Cavite

In Partial Fulfillment
of the Requirements for the Degree of
Bachelor of Science in Information Technology
with specialization in Web and Mobile Technology

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May 2026

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CHAPTER I
INTRODUCTION

Background and Rationale of the Study

With social media's rise in popularity, it has significantly affected how photography is viewed and produced. This change has given a way to new trends, distinct visual styles, and opportunities within the field of photography (Sliz, 2024). This indicates a clear transition between raw unedited photos rather than blatantly edited ones, as now audiences prefer authenticity. This change in now influences photographers to embrace a more authentic and realistic style in their work. (Sliz, 2024). Through the use of social media, it can be used to serve as a powerful medium for better storytelling in photography. Photographers have shared their insights whether these platforms can influence their artistic expression, knowledge, and shape their creative journey. Additionally, they reflect on how elements such as likes, shares, hashtags, and other engagements in social media impact the developing landscape of photography. (Watkins, 2025). The choice of camera angle "imposes a great deal of impact in photography," impacts both aesthetic and emotional reception (Schenker, n.d.). Camera angles are considerably affects the feel of the viewer and their understanding on a photograph. Understanding that camera angles play a major role in portraying a photograph's story and message is very crucial. As an example, low angle shots

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	<p>often portray subjects as strong, while high angle shots make them come off as weak.</p> <p>The recent years, smartphones have skyrocketed the relevance of photography in people's daily lives. However, taking good pictures still calls for a proper photography knowledge and skill. The current and existing photography learning tools often focus mainly on theoretical lessons without offering hands-on practice. Lectures mainly focus on theoretical content, conveyed through modules or video lectures, which does not provide interactive experiences. These platforms rarely offer adaptive guidance, personalized learning, and interactive challenges, which are critical for developing practical photography skills that can be apply to real-world photography techniques. (Zhao, 2022).</p> <p>According to Google Research research by Su et al. (2021), image composition plays an important role in photography. The researchers explained that even ordinary subjects can appear visually appealing when composed properly, while poor composition can make good subjects look very unattractive. Their study developed an AI-based system that gives real-time suggestions to users on how to adjust their camera view before taking a photo, such as shifting to different camera angles or zooming. Their findings showed that helping users compose their shots before capturing, instead of relying only on editing or cropping after, resulted in better photos 79% of the time during user tests.</p>	
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	<p>Given these problems, DigiPic will serve as the solution by offering a comprehensive digital photography e-learning system developed for LPU Cavite that aims to help users improve their photography skills. The proposed e-learning platform aims to guide the students on capturing the best photos by teaching them the correct image composition techniques such as, camera angles and frames. Features like interactive photo challenges, customized learning modules, educational modules, user account registration, and a shared gallery where users can upload their images and get feedback are all part of the mobile application. Additionally, progress tracking and profile management enhance the user's learning experience by making it dynamic and user centered. DigiPic integrates a web-based admin interface that enables administrators to oversee material, quizzes, user accounts, and community moderation in order to facilitate educational delivery and platform administration. Learning resources are kept current, pertinent, and in line with users' ability levels thanks to this approach. Through dashboards and analytics, it also enables the administration to monitor performance indicators and user interaction.</p> <p>Objectives of the Study</p> <p>The main objective of this study is to design and develop DigiPic: A Digital Photography E-Learning System, tailored for students and photography learners with an interactive and accessible learning platform. Specifically, it intends to:</p> <ol style="list-style-type: none">1. Design a mobile-based platform with features including:	
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	<ul style="list-style-type: none">a. It will allow account registration and login for users.b. Users are allowed to change and reset their password if forgotten.c. An analytics dashboard will be provided to track and display the user's progress, performance, and engagement.d. It will present educational photography content involving angle shots such as low angle, high angle, bird's-eye view, and eye-level.e. It will allow users to complete tasks that simulate real-world photo-taking scenarios and submit their outputsf. The system will provide a collaborative content community that allows users to share their photo albums with others to promote interactivity.g. It will allow users to interact with others through features such as likes and comments.h. The system will provide profile management that allows users to update their profile and personal information.i. Log-out feature that allows users to end their session with the application. <ul style="list-style-type: none">2. Develop a separate web-based platform for admin that has the following features:<ul style="list-style-type: none">a. Enables the admins to register and log in to their accountsb. It will provide a dashboard of user statistics, engagement, and	
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	<p>overall platform activity.</p> <ul style="list-style-type: none">c. The system will provide a module for administrative personnel to upload, update, and manage e-learning contents regarding photography.d. Admin will be able to upload quizzes and challenges that will help users improve their learning and skill development.e. The administration can view, monitor, and manage the users' accounts, including password reset, deactivation, and deletion.f. The system will handle Content Management System (CMS) for administrators.g. Admins are able to review and manage user-generated content to ensure the community guidelines are being followed properly.h. The system will provide a module to send bug reports to the IT support team.i. Log-out feature that allows admin to end their session with the application. <p>3. Develop a separate web-based platform for IT support that has the following features:</p> <ul style="list-style-type: none">a. Enables the IT support to log in to their accountsb. IT support is able to respond to technical issues reported by users or admin.c. The IT support team is able to help resolve login or password reset	
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	<p>issues that cannot be resolved by the administrator.</p> <p>d. IT support has the ability to grant, modify, and revoke administrative access to users.</p> <p>e. Log-out feature that allows IT support to end their session with the application.</p> <p>4. The system will be developed with a front-end build using HTML, CSS and JavaScript, while Kotlin and Nodejs will be used as back-end build, including Visual Studio Code and Android Studio.</p> <p>5. Conduct functionality and compatibility testing and evaluate system performance using ISO 25010 and MARS frameworks based on the following metrics:</p> <p>ISO 25010:</p> <p>a. Functional Suitability</p> <p>b. Performance Efficiency</p> <p>c. Compatibility</p> <p>d. Usability</p> <p>e. Reliability</p> <p>f. Security</p> <p>g. Maintainability</p> <p>h. Portability</p> <p>MARS:</p> <p>a. Functionality</p>	
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	<ul style="list-style-type: none">b. Aestheticsc. Information Qualityd. Engagement <p>Significance of the Study</p> <p>DigiPic development aligns with the trifocal mandate of the university, teaching, research, and community outreach through offering a new and engaging platform that complements digital photography instruction. This research presents a sophisticated mobile learning instrument that departs from traditional pedagogy by incorporating gamified modules, interactive multimedia, and user-centric design to foster not only technical skill but also creative thinking in the art of photography.</p> <p>General Public – For the general public, Digital Photography E-Learning System provides an easy-to-use platform that promotes lifelong learning, creative discovery, and digital learning in photography. It offers a solid and overall platform for learning photography without the essential of standard classroom environments, bridging between professional training and common interest among the general public. As mobile technology becomes an ever more integral part of present-day living, DIGIPIC enables users of all backgrounds to unlock their potential and exercise their right to artistic expression, also enriching culture and enabling individual development.</p>	
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	<p>Lyceum of the Philippines – Cavite – DigiPic aims to enhance the university's dedication to delivering state of the art, skill-oriented learning experiences in the discipline of visual and media arts. It enables incorporation of photography training, or photo college, into academic curricula through the provision of a self-paced, experiential learning system that monitors progress, and facilitates peer interaction. The platform aligns the university towards its vision of becoming a valued digitally responsive, socially conscious, and student-centered learning community.</p> <p>Learners and Photography Enthusiasts – DIGIPIC serves a large base of users whether students at the CFAD, professional photographers to be, and photography hobbyists as well as new learners that is interested in photography. The system provides an interactive learning experience that promotes hands-on study, technical command, and creative problem-solving. With real-world photography simulation, challenge-based learning, and peer-sharing functions, anyone can improve their skills and join a collaborative learning process. Whether utilized in academic environments or for personal development, DIGIPIC offers a welcoming, inspiring environment for photography instruction.</p> <p>Instructors and Administrators – With a dedicated admin interface, teachers and academic managers get an admin panel to access content management features, user performance statistics, and moderation system functions. These features enhance the delivery of instruction, make administrative</p>	
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	<p>reporting easier, and provide transparency in monitoring student learning outcomes.</p> <p>IT Support and System Developers – This research allows future developers and IT professionals to investigate the design and development of a learning system. It promotes best practice in mobile application development, data management, UI/UX design, and cloud integration and helps advance the wider field of educational technology.</p> <p>Future Researchers – This study provides an example model for future research in creating mobile-based, multimedia-rich learning applications. It presents a replicable development process, evaluation framework (ISO 25010 and MARS), and measuring metrics that can be used as a starting point for other academic fields wishing to enhance teaching through interactive technology.</p> <p>Scope and Limitation</p> <p>This research aims to design and implement DigiPic: A Digital Photography Learning System based platform for the learners of Lyceum of the Philippines University (LPU) Cavite specifically. The client of this project is an instructor in the university with professional experience in photography to ensure the pedagogy as well as relevance of the educational material. DigiPic aims to help students with basic camera angles and shot techniques such as low angle, high angle, bird’s-eye view, and eye level via interactive instruction modules,</p>	
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	<p>simulated exercises, and actual submissions. A web-based admin interface will also be designed to aid the client in controlling user accounts, tracking content submissions, and viewing analytics for assessing student performance.</p> <p>However, like all systems, the research has a number of limitations. DigiPic will only focus on learning photography composition using camera angle shots and won't cover general topics like lighting effect techniques, photo editing, or post-processing. The system will be developed specifically for the Android operating system, which could be a limitation for users of iOS or cross-platforms. The administrative functionalities like content moderation, user analysis, and account management will be limited to the web-based application and made available to the client or other designated faculty members only. While the system offers automated feedback, there is no real time instructor grading. Instead, a pointing system will be used to track the progress of the users.</p>	
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CHAPTER II

REVIEW OF RELATED LITERATURE

Literature Review

This section reviews the existing literature regarding mobile and web-based applications, centralizing the way to enhance digital learning platforms, particularly in photography education. The review is categorized under six themes: Mobile-Based Learning Systems, Multimedia-Enhanced Instructional System, Interactive Learning System, Cloud-Integrated System, Modular Learning System, and Self-Paced Learning System. Furthermore, this chapter includes a review of related literature, related studies, conceptual framework, and definition of terms.

Definition of Mobile and Web Applications

Many mobile and web-based learning systems can provide wide audience accessibility and improve educational disciplines. “Digital tools in education are reliable due to the potential to make a productive and effective learning system (Subaih et al., 2021).” This concept aligns with Digipic’s goal to create elevated access and implement user-friendly design tailored to teach photography.

Impact of Mobile and Web Applications

Educational mobile and web applications have a big influence on learners’ behavior and skill capabilities due to digital content. Chinamasa and Ncube (2023)

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	<p>stated that e-learning systems with relevant content, interactivity, and high usability can influence students' learning preferences. This contribution for DigiPic's goal is to elevate the system through personalized learning modules, instinctive interfaces, and community-based interaction features, tailored for students towards photography lessons.</p> <p>Benefits of Mobile and Web Applications</p> <p>If mobile and web applications are consistent, these will give great advantages not only for personal self-growth but also for digital education systems. Kristanto (2021) made digital photography education with a constructive approach resulting students improving their knowledge and learning outcomes due to interactive modules. This approach adopts Digipic's objective to provide photography modules, hands-on photo practices, and real-time assessments to improve their skills in photography.</p> <p>Type of System: Learning System</p> <p>There are different types of learning systems based on their purpose, functionality, and scope. Some learning systems are designed for educational content and assessments, while others have interactive and personalized experiences with advanced features. Each type of learning system benefits educational purposes to increase skills, self-growth, and efficiency from learning experiences and engagement to others.</p>	
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	Mobile-Based Learning System <p>Mobile learning systems can be used for students anywhere on the go for self-paced learning regardless of sch. Santiago et. al (2021) stated that mobile learning integrates accessibility to education and learning style extensions, increasing the students' learning pace. DigiPic uses this system to learn anytime and anywhere dedicated to students.</p> E-Learning System <p>The E-Learning system is the use of digital technologies to provide educational content, manage assessments, and investigate the interaction between students and instructors with the use of Internet. Subaih et al. (2021) emphasizes the nature of e- learning systems that can learn both synchronously and asynchronously to avoid burnout and pressure. This system is aligned with DigiPic's objective to provide accessible lesson modules, taking quizzes, real-time progress and task feedback, and showing dashboard report progress to improve students' retention and understanding the learning outcomes.</p> Multimedia-Enhanced Instructional System <p>Multimedia-enhanced systems can integrate multimedia types like text, audio, and video to elevate the learning system for better learning retention and immersive experience. In a learning environment, Lu, Liu and Bai (2022) supports the use of multimedia types in digital learning systems because integrating with it can promote better student engagement and retention. This</p>	
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	<p>concept applies with DigiPic’s task to make multimedia-rich lessons with photography challenges and real-time feedback to increase the interaction time with the content.</p> <p>Interactive Learning System</p> <p>Inversely to passive learning, an interactive learning system gives way to promote active involvement of learners with the building team of collaborators. Yusof, Dolah, and Musa (2024) stated that interactive digital methods are required in modern times as photographers need to use modern tools to learn and practice photography. This applies to DigiPic’s integration to build an e-learning system with good benefits such as foster critical thinking, increasing imaginative power, and skill training.</p> <p>Cloud-Integrated Learning System</p> <p>Storing all the data in the cloud while tracking down student progress and quick access in the cloud is the main duty of having a cloud-integrated learning system. “Cloud-based systems can keep the students’ current learning progress and reenter lessons to recap what is missing for further train their photography skills (González-Carrasco et al., 2021).” DigiPic offers cloud service to access and use the learning modules from multiple devices.</p>	
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	Modular Learning System <p>DigiPic is becoming a modular learning system that separates into small and manageable groups for each student's pace of learning. Serrano (2023) pointed out the importance of having a modular learning system, to recognize its incremental process for adjusting the required settings of a camera. This is the crucial tool to let students focus on what is needed to adjust.</p> Self-Paced Learning System <p>Self-paced e-learning systems are important for learners' progress to feel self-paced without pressure of schedules. Katsaris and Vidakis (2021) said implementing this function provides benefits to learners such as increased engagement, reduce cognitive load, and influence actions from learning outcomes. This supports DigiPic's motive to create an e-learning system with lesson module access, take quizzes, practice angle capture techniques, and learn the basic concepts of photography.</p> Photography Course Lessons <p>Improving self-discipline and skills are essential to build an e-learning system dedicated to practice-based courses, like photography. Sukmana and Sudarma (2021) pointed out the effectiveness of project-based e-learning systems to increase learners' study and demonstration of photography practice. DigiPic implementing a similar approach by integrating lessons with challenges and photo</p>	
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	<p>submissions to have real-time feedback and iterative times to train the right skills of photography.</p> <p>Quiz and Hands-on Practices</p> <p>This feature is crucial for any digital learning systems, to oversee the progress and areas for improvement of each student. Serrano (2023) emphasizes the nature of quizzes and hands-on practices to become tools for sharpening and building up the skill capabilities to the limit with their acquired knowledge. DigiPic integrates this feature to challenge students' efforts of photography skills from learning the lessons, ensuring a complete approach.</p> <p>Dashboard Progress</p> <p>Progress dashboard is a vital feature in any digital learning system; this serves as a review of the whole progress and growth areas. This feature encourages students to continue their learning journey by reading the results and capacity of hardworking efforts. This inherits DigiPic's objective to look at their lesson progression, quiz scores, and milestones for improvement.</p> <p>Functionality</p> <p>To have a seamless application with user experience, functionality is a must for making high-quality digital learning systems. Ndirangu et al. (2018) said that easy navigation, interactive elements, and fast performance of a digital learning system influence increased user engagement and satisfaction. DigiPic</p>	
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	<p>organizes the interface into a neat and intuitive UI for photography lessons, quizzes, and hands-on tasks. This can do most basic tasks as well such as login function, view dashboard statistics, and submission of outputs without errors.</p> <p>Aesthetics</p> <p>To increase user involvement and satisfaction, the digital learning system requires a neat and beautiful design. Bencsik et. al (2021) highlighted the effectiveness of a well-designed digital education system that can promote student motivation and immersive learning experience. This criterion aligns the inspiration of photographic arts for DigiPic with the use of clean and modern layouts, attracting people to use the app for longer time.</p> <p>Quality</p> <p>The quality of digital learning systems is crucial because it is a way to let the system evaluate to have reliability, performance, and usability. ISO 25010 Standard gets the benefit to inspect the system to ensure it has functionality, efficiency, security, and maintainability. DigiPic applies this kind of standard to justify the need to have optimal apps, with a smooth and uninterrupted experience.</p> <p>Economy</p> <p>Digital Learning System building is not complete without planning out the economic budget from the tools and resources for app development. Serrano</p>	
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	<p>(2023) pointed out that the development costs and maintenance costs can be considered. DigiPic is a cost-effective system that using paid scalable resources for development while providing them high-quality learning experience.</p> <p>Scalability</p> <p>Scalability is crucial to e-learning system as number of users increasing and need to expand the contents by updates and maintenance. Dristas and Trigka (2020) noted that scalability must have resilient system architectures to continue evolving with new features. DigPic implements cloud-based system using Firebase, to expand the overall content, support the user count and enhance future new functionalities without performance issues.</p> <p><i>Development Technologies</i></p> <p>Visual Studio Code</p> <p>Visual Studio Code is the most common code editor to make a project with multiple programming languages and tools, to become a system developer. There are a lot of mobile and web applications that acknowledge the importance of a versatile coding environment. DigiPic uses this coding editor for web development to admins with working functionalities and neat webpage design.</p> <p>Firebase</p> <p>Firebase is a platform for mobile applications that provides real-time databases, authentication, and cloud storage. González-Carrasco et. al (2021)</p>	
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	<p>pointed out that Firebase serves as a tool for scalability to digital learning systems. DigiPic used this tool to handle user data, track progress, and repository storage.</p> <p>HTML and CSS</p> <p>HTML and CSS formed a standard backbone for web development, providing design and formation of web pages. Based on what Bencsik et al. (2021) stated, these tools are the foundation to make quick action and user-friendly web platforms. DigiPic employs these to create a frontend interface for web version of the system, making it more appealing and accessible, especially to the functionalities.</p> <p>Kotlin</p> <p>Kotlin is an Android app development programming language dedicated to Android, supported by Google. Tanwirulaulub (2025) clarified that Kotlin can be used as a material to build e-learning system with safe and operative without issues. With Kotlin, DigiPic employ this tool to build a structured and efficient learning platform.</p> <p>Android Studio</p> <p>Android Studio is the leading and official IDE for Android development to collaborate the tools and features for building high standard quality mobile applications. Iskandar et al. (2023) recognizes the power of Android Studio for designing and building educational e-learning systems to various Android phones.</p>	
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	<p>This will help in DigiPic’s system development to have mobile-based app with learning photography lessons, quiz modules, and photo practices.</p> <p><i>Standard Metrics Used</i></p> <p>MARS (Mobile App Rating Scale)</p> <p>Evaluating the mobile app quality to look for ratings of engagement, functionality, and user experience is the purpose of MARS Evaluation Tool. Framework testing is essential to ensure that mobile apps meet the objectives and educational goals. DigiPic will be evaluated using MARS to rate the app on how engaging, functional, and user-friendly the app dedicated for photography learning.</p> <p>ISO 25010 (Software Quality Evaluation Standard)</p> <p>ISO 25010 standard inspect the software’s reliability, usability, and maintainability. González-Carrasco et. al (2021) emphasize that the quality standards are crucial to have a guaranteed balanced software. DigiPic will be evaluated against the standard to meet the highest quality criteria.</p> <p>Related Studies Review</p> <p>Gamification and the History of Art in Secondary Education: A Didactic Intervention (Serrano, 2023)</p>	
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	<p>Serrano (2023) applied a digital Art History course for secondary school students. Their study shows positive impacts, proving that the students who went through this digitally enhanced learning situation showed improvement in their level of engagement and an increased level of motivation to carry on studying the subject matter. This study focuses more particularly on how blending simple, interactive functionalities within a digital learning system can enhance a more exciting and interactive learning environment. This may increase the engagement level of students with further appreciation and love for visually related studies.</p> <p>This research's results on increased involvement and motivation via online interventions highly verify the purpose of DigiPic to inspire more user engagement and commitment in learning photography, especially for its content and interactive nature.</p> <p>Digital Learning System with Interactive and Collaborative Elements (Er, 2022)</p> <p>In his study, Er (2022) elaborately investigated the potential of contemporary digital learning systems and how their interactive and collaborative nature affect the development of students. The research comprehensively concluded that advanced systems enhance the imaginative capacity of learners to a great extent and directly help in their specialization in different academic and applied fields.</p> <p>The focus on collaborative and interactive elements in Er's research closely</p>	
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	<p>corresponds with DigiPic's intention of developing an adaptive learning platform that boosts user imagination and expertise in photography, enabling users to monitor their improvement and interact with others.</p> <p>Digital Tools in Learning Systems (Ferroukhi et al., 2020)</p> <p>Ferroukhi et al. (2020) explored the key promise of digital equipment integrated in learning mechanisms to significantly improve the overall quality of visual products, significantly highlighting the high-definition look of images. Their experiential findings, more evidently witnessed in dental aesthetic research, consistently revealed a quantifiable improvement in the accuracy and better quality of photographs taken through the tactical use of sophisticated digital tools.</p> <p>Ferroukhi et al.'s showed of how digital components increase the image accuracy aligns with DigiPic's technique. This research proves that DigiPic's goal to use of digital elements for accurate image taking and skill practice, which is a essential aspect of successful photography education and analysis the users.</p> <p>Augmented Reality (AR) in Photography Learning Apps (Zhao et al., 2022)</p> <p>Zhao et al. (2022) did research on investigating the real-world applications of Augmented Reality in photography learning software. According to their findings, incorporating AR features was found to be beneficial to users in hands-on practice exercises and enhancing the learning process to be more interactive and experiential.</p>	
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	<p>Zhao et al.'s results on the effectiveness of AR, hands on training can influence DigiPic's design. This shows that adding AR features would greatly improve the DigiPic's ability to deliver more engaging and effective active training in learning photography angle shots and techniques.</p> <p>Digital Art Education with Interactive Media Interaction (Kim, Lee, Choi, 2022)</p> <p>Digital Art Education involving interactive media interaction has the ability to provide immediate feedback and practice hands-on to help student acquire and refine their skills in photography (Kim, Lee, Choi, 2022)</p> <p>The results by Kim, Lee, and Choi highlight the effectiveness of interactive media with feedback in real time for skills acquisition. This concept is explicitly implemented in DigiPic to help students acquire and refine their photography skills through exercising and real-time guidance within the interactive modules.</p> <p>The Impact of the Increasing Popularity of Digital Art on the Current Job Market for Artists Wang and Wang, 2021)</p> <p>DigiPic is not only for studying all about photography but provides a chance to meet the employment need for digital artists. Wang and Wang (2021) noted that there are some entertainment and marketing sectors that require talented artists in the future.</p>	
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	<p>Wang and Wang's explanation regarding the need for proficiency in digital artists and the use of customized experiences in acquiring skills aligns with the overall goal of DigiPic. It shows the validity of DigiPic's design as a system that develops high skilled photography by equipping users with awareness for future employment needs in the relevant creative fields.</p> <p>Interactive Mobile Tools in Photography Learning Apps (Wu and Jia, 2021)</p> <p>Wu and Jia (2021) did research on how effective interactive mobile tools tailored for the use of photography learning applications can be. Their study indicated that these tools were of great use to novice photographers as they allowed them to train themselves and improve their photography effectively. One of the major findings was the primary impact of instant feedback offered by these technologies, which was a prime guide for the learners during their skill acquisition process, facilitating an iterative and self-directed learning experience adapted to personal advancement and comprehension.</p> <p>Wu and Jia's study highlighted that the effectiveness of interactive mobile tools and timely feedback for learning beginners independently. This supports directly DigiPic's design concept of giving an iterative learning environment with ongoing feedback so that the students can learn photography skills conveniently and efficiently.</p>	
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	<p>On the signature pedagogy of photography courses from the perspective of visual communication design Yuanyuan Xu (2021)</p> <p>Yuanyuan Xu (2021) explored the unique teaching strategy of photography courses, particularly from the viewpoint of visual design. This research undergo into how photography education is organized to helpfully teach the students the principles of users delivering messages and ideas through visual means like photography.</p> <p>This study on visual communication design is highly relevant to DigiPic, as it emphasizes the importance of a thoughtfully designed instructional approach. DigiPic aims to embody these principles by offering structured lessons and practical exercises that specifically train users in visual communication through photography, making sure the system aligns with effective pedagogical practices in the field.</p> <p>Optimizing Student Photography Skills Through Development of Project Based E-Learning in Photography Courses (Sukmana and Sudarma, 2021).</p> <p>Sukmana and Sudarma (2021) performed a research mainly targeting the optimization of students' photography skills via strategic project-based e-learning development and implementation in formal photography courses. Their in-depth study highlighted how such a specific pedagogical practice can significantly enhance students' command over both theoretical and necessary practical aspects</p>	
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of photography, hence addressing directly prevalent challenges usually encountered in traditional learning outcomes.

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	<p>This research study follows DigiPic's approach, specifically its emphasis on practical and skill acquisition. By using a project-based learning model, DigiPic is able to offer an orderly and adjustable setting under which users can implement conceptual learning and extend the users photography capabilities considerably.</p> <p>Digital peer feedback on visual ideas: a study of eighth-grade students in visual art (Forslind, Hrastinski, and Forsler, 2023)</p> <p>Forslind, Hrastinski, and Forsler (2023) study on the effectiveness of digital peer feedback as a tool for developing visual ideas among eighth-grade students in visual art education. Through their study, they investigated how the students employ digital tools, e.g., mobile phones to take visual ideas and online sites for peer commenting and sharing, to offer constructive criticism to their colleagues. The results indicated that participation in computer-aided peer review activities has the potential to positively enhance students' capabilities for creating and improving their visual ideas, to develop self-regulated learning, and collaborative skill acquisition in an iterative creative process.</p> <p>This research provides useful recommendations for DigiPic, specifically regarding incorporating peer review mechanisms. It proposes that by implementing digital technologies for sharing images and allowing peer critique, DigiPic might develop a strong collaborative learning system, where users can</p>	
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	<p>obtain constructive feedback, improve their photographic compositions, and enhance their visual communication skills better.</p> <p>Digital Game-Based Learning Using In-Game Photo Modes (Mago, 2023)</p> <p>Mago (2023) studied the possibility of digital game-based learning by applying in-game photography modes as training tools for photographic abilities. The investigation checked how video game photo modes, which feature in other games like Red Dead Redemption 2, Honkai Star Rail and The Last of Us Part II, enable users to learn about fundamental photography such as composition, lighting, framing, and visual narrative. The study emphasized that such virtual spaces mimic actual conditions of photography, allowing learning to happen through innovative exploration without commercial camera use. Through the use of gameplay as a learning platform, the study revealed that gamers acquired enhanced sensitivities to visual aesthetics and technical knowledge through repeated practice and self-discovery.</p> <p>This study is closely in line with DigiPic's goal by confirming that interactive simulations are usable learning platforms for photography students. The results of Mago's work are usable in DigiPic's vision of providing a digital platform where users can develop their skills and interactive challenges regardless of whether they have access to advanced equipments.</p>	
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	<p>DigiPic implements the app to have modular learning, real-time feedback, cloud-based storage, and photo sharing and posting into one platform. With additional features that are not found in traditional photography lessons, DigiPic provides a digital application to interact with others, and collaborate digitally with the benefit of a comprehensive and accessible system.</p>	
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Conceptual Framework

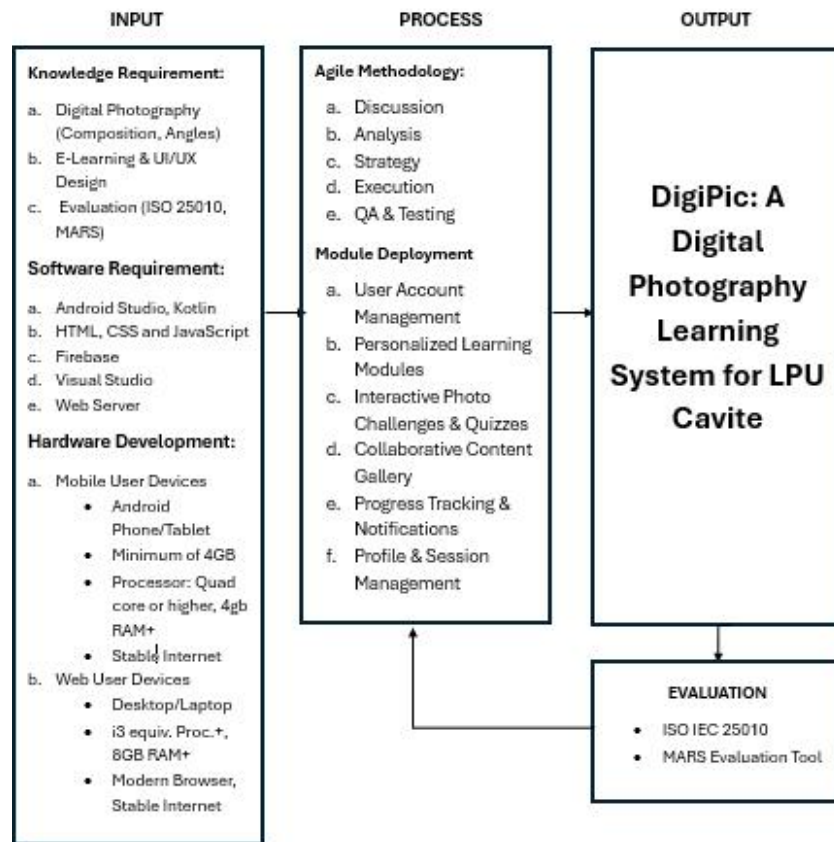


Figure 1. Conceptual Framework of the DigiPic: A Digital Photography E-Learning System for LPU Cavite

The figure shows the conceptual framework under which DigiPic: A Digital Photography Learning System for LPU Cavite is developed and evaluated. This framework is organized into three primary components: Input, Process, and System Output with a general evaluation criterion that ensures quality.

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	<p>During the Input stage, the required requirement for successful development of the Digital Photography Learning System is outlined. Knowledge needs include experience in digital photography concepts, specifically composition and different angle shots, and skill in designing e-learning platform interfaces and user interface/user experience (UI/UX) concepts. This stage also involves familiarity with system evaluation methods such as ISO 25010 and MARS frameworks. Software Requirements enumerate the requisite development tools and platforms, e.g., Android Studio, Kotlin, Firebase as the backend and database solution, web technologies like HTML, CSS, JavaScript, Visual Studio, and necessary web server environment. Hardware Requirements describe the standard specifications for the users' devices, such as Android smartphones/tablets with sufficient processors and RAM, and stable internet connectivity for mobile users. For administrative support and IT help web access, typical desktop/laptop specs with recent browsers and reliable internet are considered.</p> <p>The Process area describes the arranged process of building Digital Photography e-Learning System and its key features. Development follows Agile Methodology, an iterative process that includes cycles of discussion, thorough analysis, strategic planning, development (coding and implementation), and strict quality assurance and testing to reflect ongoing improvement and flexibility. Module Deployment outlines the major features incorporated into the DigiPic system. This encompasses user account management (sign-up, login, profile), the</p>	
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	<p>main learning modules, interactive photo challenges and quizzes for practical usage and for testing knowledge, a community content gallery for sharing and user interaction, complete progress monitoring and alerts to stimulate learners, and effective profile and session management functions.</p> <p>The result of this process is the resulting DigiPic: A Digital Photography Learning System for LPU Cavite, designed to allow students to better their photography skills. The usability and performance of this system will be tested against ISO 25010 Standards to ensure its reliability, usability, performance, and overall suitability for its intended purpose.</p>	
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	Definition of Terms <p>For the readers to fully comprehend this study, the following are the notable terms that have been utilized in the study:</p> <p>Agile Methodology – Agile Methodology is a method of software development that is an iterative and also progressive, it focuses on collaboration and flexibility of functional pieces through ongoing cycles of planning, analysis, design, implementation, and testing.</p> <p>Angle Shots – This is a detailed camera angles that are commonly used in photography in order to create a specific visual effect or to show subjects, this technique includes low angle, high angle, bird's-eye view, and eye-level.</p> <p>Collaborative Gallery – A user feature in the DigiPic system where users can post and get feedback on their photos from users through likes and comments.</p> <p>Composition (Photography) – The intentional organization of visual elements in a photographic composition, required for producing visually appealing, balanced, and effective photos.</p> <p>DigiPic – A web-based photography e-learning system created for Lyceum of the Philippines University-Cavite to increase the photography skills of its users through modules, situational challenges, Quizzes and social interaction.</p>	
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	<p>Digital Photography – The art and technique of shooting and recording images using electric sensors instead of film, including techniques dealing with light, focusing, composition, and post-processing.</p> <p>E-Learning System – An education platform that utilizes digital technologies and connectivity on the internet to provide instruction content, conduct assessments, and administer learner interactions with education resources.</p> <p>Firebase – A full-featured web and mobile app development platform from Google, used as the backend service of DigiPic, with features such as real-time database, authentication, and cloud hosting.</p> <p>Interactive Photo Exercises – A hands-on activities within the DigiPic framework that copies the actual photography situations, so users can practice techniques learned and present their creative efforts for assessment, frequently in conjunction with built-in quizzes to ascertain if understanding is being transferred.</p> <p>ISO 25010 – A global software product quality standard that specifies an extensive model for assessing different attributes of a system, such as its functional suitability, efficiency in performance, compatibility, usability, reliability, security, maintenance, and portability.</p> <p>Learning Modules – Independent units of instructional material within the</p>	
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	<p>DigiPic environment, organized to sequentially instruct particular digital photography principles and capabilities through lessons, illustrations, and embedded quizzes.</p> <p>Mobile Application – An application program specifically coded to run on portable hardware such as smartphones and tablets, used as the main user interface to access the DigiPic instructional content.</p> <p>Pedagogy – a teaching method and practice. Interactive digital modules are used to teach photography lessons based on pedagogy in this project. This ensures education approach is effective, engaging to students, and suited to the needs of students.</p> <p>Trifocal – Higher education’s three roles are instruction, research, and community service. DigiPic supports all three by promoting learning, enabling research, and providing outreach through digital education. The university’s dedication to comprehensive academic development is strengthened by this alignment.</p> <p>Web-Based Platform – A computer program that is accessed through a web browser on the internet, used in the DigiPic for the management control (Admin Portal) and technical support activities (IT Support Portal).</p>	
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CHAPTER III

METHODOLOGY

Research Design

To efficiently direct the design, development, and assessment of the system, this project will combine the Agile development technique with a quantitative research design. The project will utilize the flexible approach of Agile methodology in system development that prioritizes adaptability and more adaptable to change, called sprints. These sprints would allow the incremental development of the system. After each sprints the gathered feedback from the planning, implementation, testing, and review stages to will be reviewed to make enhancements. By emphasizing regular evaluation and continuous improvement, Agile ensures the development process remains responsive and aligned with user needs (Laoyan, 2025).

In order to accurately measure the system's effectiveness, the researchers will employ, a quantitative research approach. By collecting and analyzing the numerical data , this can guarantee that the overall results will be accurate and reliable. Such approaches include task-based assessments, structured

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	<p>questionnaires, and established evaluation frameworks. These discoveries will directly guide incremental improvements inside the Agile cycles.</p> <p>The researchers anticipate that the research and development methods outlined above to help achieve a practical, user-oriented digital photography learning platform, ultimately being part of DigiPic’s development. Through basing on accurate and data-driven insights, quantitative evaluation within Agile’s iterative process will ensure responsive improvements in the system’s usability, effectiveness, and general engagement.</p> <p>Sampling Technique</p> <p>The main approach for choosing study participants will be the use of purposive sampling, more especially the quota sampling method. Purposive quota sampling is a non-probability sampling technique in which the researcher specifically chooses participants according to predetermined standards in order to meet predetermined quotas. This method ensures that the selected sample accurately represents the key groups that the study intends to examine, thus ensuring relevant and reliable findings. The quota groups range from the primary educational beneficiaries (students), administrative oversight (faculty/admin), and technical support (IT staff) as long as the participants are interested in using the system.</p>	
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	Participants of the Study <p>The participants who are involved in the evaluation of DigiPic: A Digital Photography E-Learning System are constituted within the target users of the application. These include:</p> <p>Aspiring Photographers and General Individuals who have little to no skills experience in photography but are willing to learn to take photography lessons for gaining photography skills. These groups serve as supporting users for an additional audience to evaluate the DigiPic application.</p> <p>Photography Instructors and Educators who speak on the insights and thoughts of the app's effectiveness. They also serve as a consultant to see if the app is relevant and adheres to the existing course standards.</p> Research Locale <p>DigiPic was conducted in Lyceum of the Philippines University – Cavite (LPU Cavite), a private , non-sectarian university that is known for its strong commitment and academic excellence, digital innovation, and academic performance.</p> <p>The university offers a wide range of programs , it includes under the College of Fine Arts and Design, a course in visual arts and media arts, especially digital photography, as a core component of the department's curriculum. This</p>	
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	<p>makes DigiPic designed to enhance students' creativity and technical skills, a perfect fit for implementing at Lyceum of the Philippines University – Cavite.</p> <p>Lyceum of the Philippines University – Cavite was selected as the research locale due to its emphasis on offering dynamic, student-centered learning experiences and its receptiveness to technology-driven learning. Examining the DigiPic system's usability, effectiveness, and educational value was made possible by the university's varied student body.</p> <p>Through the system's implementation at Lyceum of the Philippines University – Cavite, the researchers were able to gather relevant feedback from a broad range of users, including the administrators in technology management, students, and students with different degrees of photography knowledge.</p> <p>Research Instrument</p> <p>The main research tool used by the researchers to evaluate the efficacy, usability, and overall experience of the DigiPic system was a questionnaire based on the Mobile App Rating Scale (MARS) and the ISO/IEC 25010 Software Quality Model, which evaluated important elements such as functionality, engagement, and aesthetics.</p> <p>The surveys and user experience testing are the primary research instruments to be used for the study. This will evaluate students' opinion and</p>	
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behaviors about photography, including the learning experience and overall feedback towards the app. The degree which participants agreed with various statements related to their experience with the system was gauge using a 4-point Likert scale. This tool was given to students to gather data on the system's effectiveness and learning impact.

Numerical Rating	Equivalent
1	Very Satisfied
2	Satisfied
3	Dissatisfied
4	Very Dissatisfied

Data Gathering Procedure

Data gathering for DigiPic is crucial for both development and evaluation of the system. This method helps the need to assess and meet the needs and expectations of the app for intended users—students, instructors, and IT support staff. The proponents use both qualitative and quantitative methods to gather relevant data and support the system’s design.

1. Data gathering for DigiPic is crucial for both development and evaluation of the system. This method helps the need to assess and meet the needs and expectations of the app for intended users—students, instructors, and IT support staff. The proponents use both qualitative and quantitative methods to gather relevant data and support the system’s design.

Preliminary Research

Relevant data have gathered through review of related literature and research existing photography learning systems to bridge the problem gap, add more features, and gain user preferences.

2. Interviews and Surveys

Structured formal interviews and surveys have been conducted to the selected participants to gather requirements on building the DigiPic app. These are important to gather what are the requirements of the system like UI/UX design, app features, etc.

3. Direct Observation

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	<p>A direct observation was conducted with selected learners to evaluate their behavior towards e-learning systems, challenges in learning, and expectations of interface. This phase shapes the UI/UX design from initial evaluations to make a cleaner and neater interface of the app.</p> <p>4. System Testing and Feedback</p> <p>To acquire feedback on the user's thoughts while using the app, the participants were asked to perform specific tasks. Feedback results were gathered for the refinement and final adjustments to use DigiPic for development.</p> <p>5. Evaluation and Documentation</p> <p>All the compiled feedback, user evaluation results, and performance ratings were used to final system evaluation and make a final documentation of the results with conclusion and recommendations of the study for future development.</p>	
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System Development Process

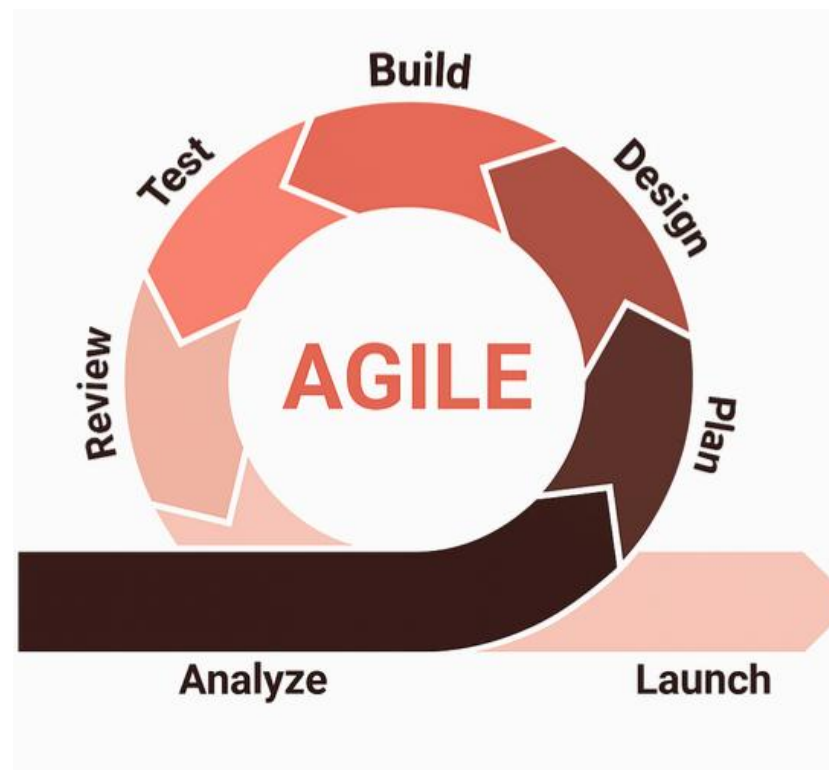
Agile Methodology is the main SDLC tool for this project in system development. It is also where iterative development and testing could make a improvement application process.

This involves the following stages:

1. **Plan** – design the app's main purposes, intended users like students and photo enthusiast, project scope, and timeline, as well as matching with the school's academic and design guidelines.
2. **Design** – Create a comprehensive UI/UX wireframes, select the best color palettes, fonts, and navigation flow, considering that the school's identity and student-centric experience.
3. **Build** – Start coding the app with Android Studio and Visual Studio Code, implementing Firebase for handling real-time data, user authentication, and the bug report or feedback gathering system.
4. **Test**– Perform thorough functional and usability testing, have real users interact with the app, find problems, performance bottlenecks, or confusing functions for rework.
5. **Review** – Gather user feedback, developer comments, and QA outcomes to confirm if the app satisfies all requirements, desired features, and conforms to student expectations and standards.

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6. **Analyze** – Utilize ISO 25010 and MARS frameworks to quantify system quality, levels of engagement, aesthetics, and dependability. Determine areas of improvement and verify effectiveness of the platform.
7. **Launch** – Formulate release of DigiPic to the public by making it accessible to everyone. Offer onboarding support, IT support, and ongoing surveillance for continuous improvement.



***Figure 2.** SDLC Figure of the DigiPic: A Digital Photography E-Learning System
for LPU Cavite*

System Architecture

The architecture of DigiPic was designed a mobile application that utilizes Firebase as its backend infrastructure. DigiPic implements client-server model with three primary user types: Users (learners and students), Admins, and IT Support Staff. The user side provides access via mobile application; this will give way to learners to use the app for educational journeys. The administrative staff handles and overlooks user accounts, educational course materials, and content management via web browsers. This architecture allows consistent interaction between users and system services with Firebase to take care of backend functions like authentication, content sharing, and real-time updates.

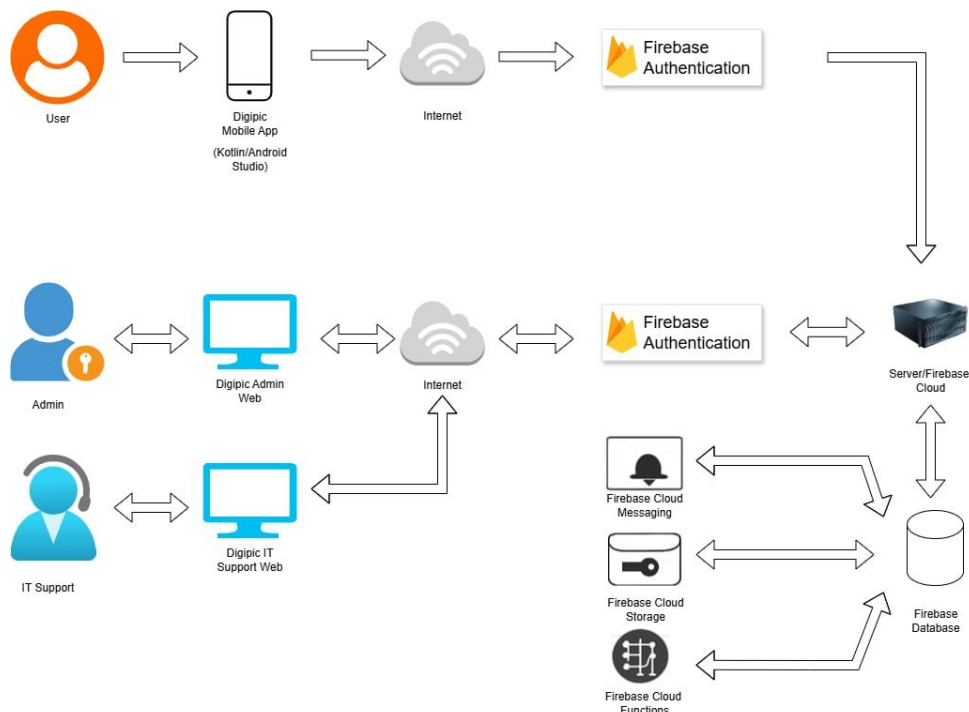
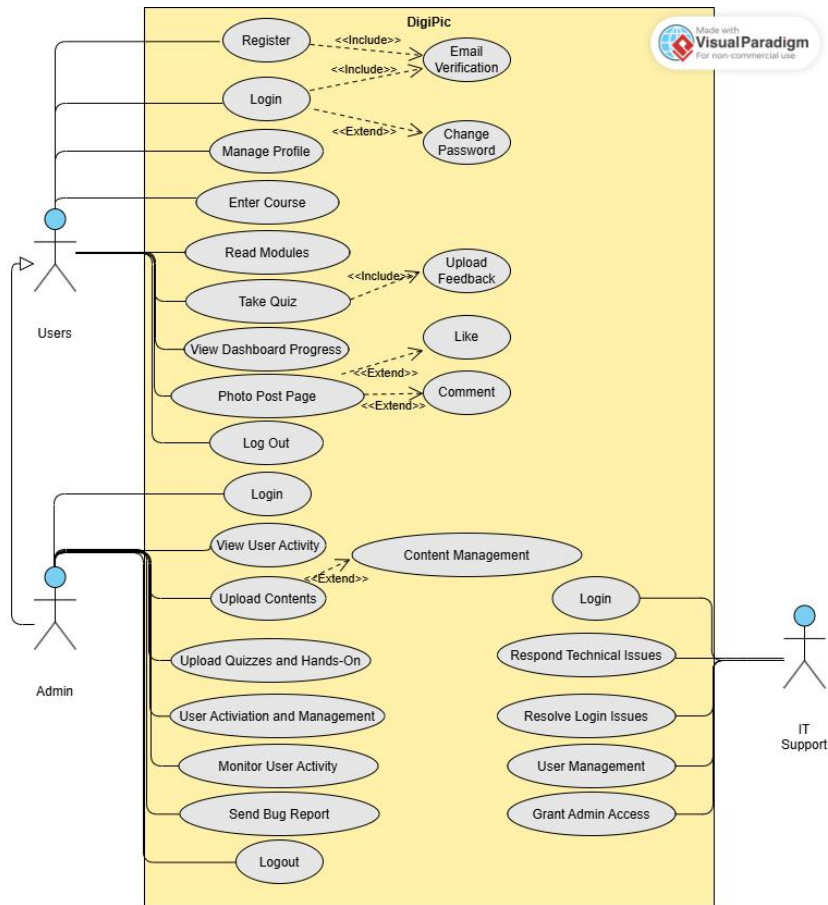


Figure 3. System Architecture for DigiPic: A Digital Photography e-Learning

System for LPU Cavite



Use Case Diagram

Figure 4. *The Use-Case Diagram for DigiPic: A Digital Photography e-Learning System for LPU Cavite*

Figure 4 represents the Use Case Diagram of DigiPic, showing the various interaction between users and its core functionalities. The system supports three main functions: the users, admins, and IT support. Users can perform common user action such as account registration, login access, and profile management. They can also enter photography courses, read modules, upload and share images

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through post page, take quizzes and hands-on activities, and view their dashboard progress.

Admins can login to their accounts in the same manner as users but with different approaches. They can inspect and manage photography lessons, uploading lesson resources, and making quizzes and hands-on activities. They can help users to gain access from users and manage user management. At the same time, the administrators have gained access to manage and operate the system. They can also handle bug reports from users to send it for IT support.

In IT support, they can login in a separate site for IT support team. They can handle technical issues within the system, resolve login issues of users that administrators can't fix, and gain control of administrator access to grant, modify, and revoke the credentials.

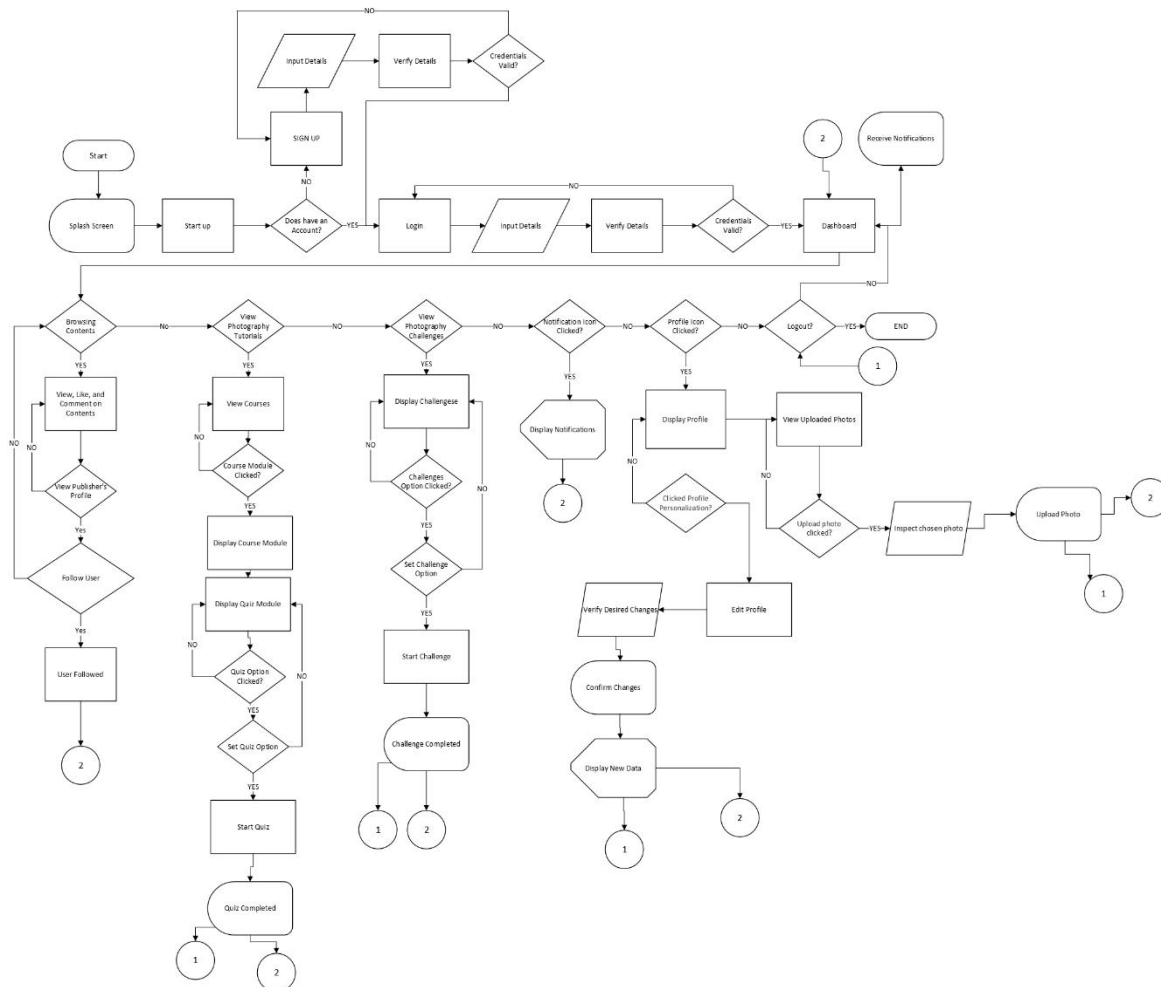
These tasks ensure the high standards and provide non-threatening content to show within the system. Overall, this diagram explains the functional boundaries of DigiPic system, showcasing how the service and feature interaction works with different user types.

Flow Chart

Figure 5 presents the User Flowchart. The flow begins with a startup process after the splash screen. After that, it allows users to create a new account on the sign-up page or log in page with their own existing account. Once their existing account provided is verified, the users are directed to the dashboard or homepage where they can access a variety of options including viewing

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photography content, taking challenges, checking their notification, and managing their own profile. Users can choose courses, view course modules, answer quizzes that are provided by the admin, or complete challenges. The system simplifies interaction by allowing users to like and comment on photos posted by publishers, browse on their feed, and follow other users. Additionally, users can upload their photos and can change their information on their profile page. When the user signs off the system, the session ends.



User Flowchart

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Figure 5. The Flowchart Diagram for DigiPic: A Digital Photography e-Learning System for LPU Cavite

Admin Flowchart

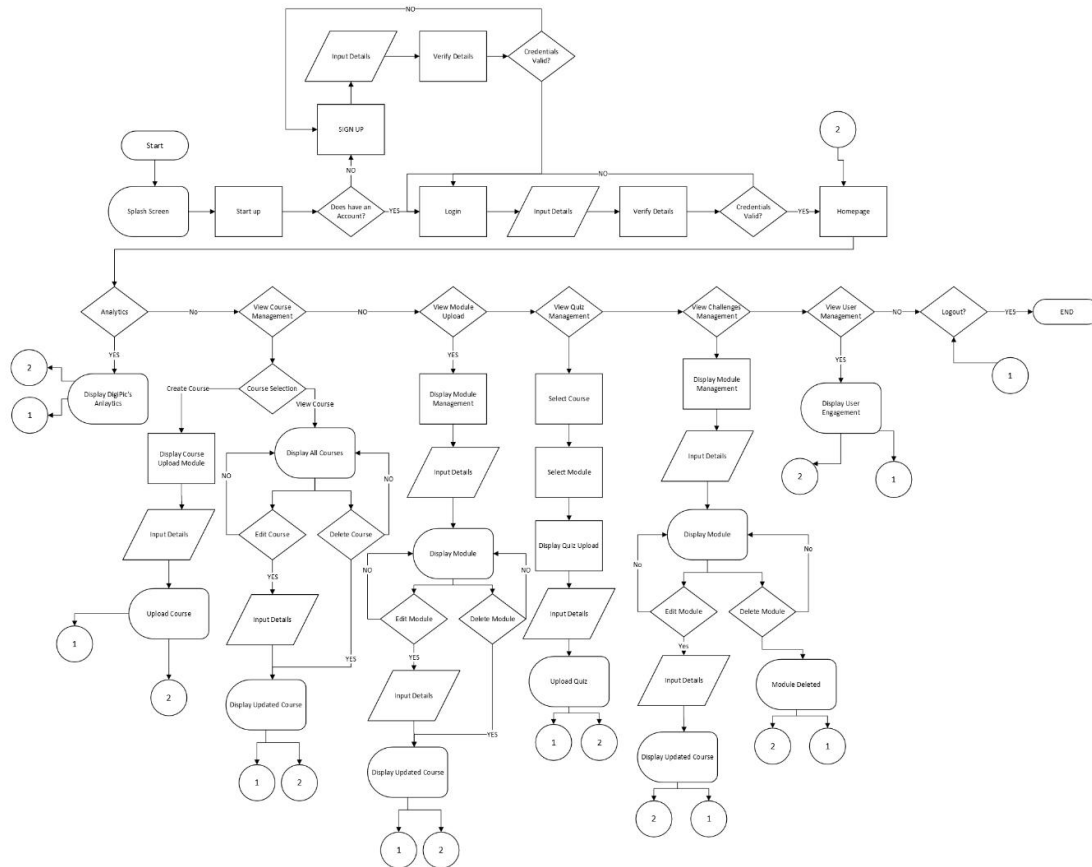


Figure 6. The Flowchart Diagram for DigiPic: A Digital Photography e-Learning System for LPU Cavite

Figure 6 shows the admin flowchart begins with the splash screen, and startup, then goes to the sign up or login process with their valid credentials. After authentication, the admins can now access the homepage where they can do various administrative tasks. These include viewing analytics, managing courses, modules, quizzes, challenges, and

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	<p>monitoring user accounts. Admins can also create, edit, delete, and upload course and module contents as well as giving users challenges and quizzes. The analytics show the user's performance and their engagement with the system. Admins can also monitor the activity of users. The administrator has the option to end their session by logging out after the tasks are completed.</p> <p>Data Analysis</p> <p>The study will utilize quantitative methods for data analysis. Quantitative analysis involves using the pre-test and post-test survey results to measure improvements in students' photography knowledge and skills. A 4-point Likert scale will be used to measure the system's effectiveness and learning impact.</p> <p>Ethical Considerations</p> <p>Every IT research or capstone project requires ethical considerations to establish system development, system launch, and system evaluation respect the rights, privacy, and well-being of all participants and users. Data collection of materials like surveys, interviews, and analytics have supervised and informed consent and participation volunteer. All their private information and responses confidentiality are protected in compliance with data privacy regulations in the Philippines. These ensure that DigiPic is a safe app dedicated to all users selected with educational compliance. Here are the ethical considerations adhered for the development of DigiPic:</p>	
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	1. Data Privacy and Confidentiality <p>The development of DigiPic complies with Philippines Data Privacy Act of 2012 and assures participants that all their private feedback and personal information are confidential with consent agreement.</p> 2. Informed Consent <p>All the participants are fully aware the purpose, range, and project nature before providing the data gathering. At the beginning of data collection, a consent form is sent to assure that the process is legitimate and harmless.</p> 3. Intellectual Property and Plagiarism <p>The information within the capstone project is collected and paraphrased with proper citation of original sources and acknowledge the previous researchers with their proposed research.</p> 4. Cybersecurity and Protection from Harm <p>For IT-related systems, DigiPic is harmless and resilient software system involve backend functionalities. This system also provide protection from harm of mental, physical, and emotional well-being of users to build the system with ethical compliances to shield against cyber threats and unauthorized access</p> 5. Bias and Fairness <p>For app evaluation and comments for improvement, all the feedback from users were unbiased and inclusive. This ensures to rate and evaluate the app based on performance metrics and criterion. Transparency was also the maintenance for ensuring user feedback with complied ethical considerations to ensure fairness, accountability, and iterative refinement to DigiPic for better features.</p>	
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	<p>All these ethical considerations in DigiPic were applied with full responsibility, user agreements, and sharing broader technical system to other researchers in the future.</p>	
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APPENDICES

APPENDIX A

COLLEGE OF INFORMATION AND COMPUTER SCIENCE

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

July 10, 2025


Mr. Willie John Dordas
Professor
College of Fine Arts and Design
Lyceum of the Philippines University Cavite
Governor's Drive, General Trias, Cavite

Dear Mr. Dordas,

Greetings in *Veritas et Fortitudo Pro Deo et Patria*.

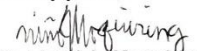
We the Bachelor of Science in Information Technology students are currently conducting a research project entitled "**DigiPic: A Digital Photography Learning System for LPU Cavite**". The system aims to develop a digital platform to optimize the teaching methods of photography lessons within the school premises. This requirement is a Capstone Project course being handled by the undersigned professor.

In line with this, we would like to request your assistance and expertise throughout the development process of the project. Your knowledge and skills will help the project achieve its objective. Also, we also need the materials to use from your department to make the project more believable and aligned with the high standards.

Rest assured that all information gathered shall be treated with strict confidentiality and for academic purposes only.

Thank you very much and looking forward to your approval regarding this matter.

Sincerely yours,


Niño Lloyd A. Moquining
Project Leader

Endorsed By:


Mr. Joven B. Cajigas
Research Adviser

Noted:


Ms. Alyssa Paola Pocaan
Program Chair, BSIT


Ms. Jerian R. Peren
Department Head, DCS

Communication Letter with Client