

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

**EduConnect: AN E-LEARNING SYSTEM FOR SENIOR HIGH SCHOOL
STUDENTS OF CAVITE SCIENCE INTEGRATED SCHOOL,
MARAGONDON, CAVITE**

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Bachelor of Science in Information Technology
with specialization in Web and Mobile Technology

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CHAPTER I
INTRODUCTION

Background and Rationale of the Study

In recent years, e-learning technologies significantly transformed the way how education is delivered, particularly in primary and secondary schools. The ever-rising availability of mobile devices and internet connections has made e-learning systems more important for education. They encourage the use of better online and blended learning. Mobile and online virtual classrooms as well as AI innovations are changing the digital education trends (Zou et al. 2025). These systems enable personalized learning, real-time analytics, and self-driven education, which helps students learn better, especially when they are away from school and on a busy schedule. A comprehensive review of e-learning system usage during pandemic-era classes revealed several advantages mainly the continued access to education despite the lockdowns. Also, the flexible learning schedules, interactive digital content, and improved student autonomy in managing academic tasks. These platforms enabled schools to maintain instructional delivery while supporting individualized learning experiences suited to remote settings (Adnan, M., 2020).

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	<p>The use of Learning Management Systems (LMS) has offered a lot of value for education in the past few years. The critical need for continuity of learning during school closures due to the COVID-19 pandemic made it necessary to use LMS tools. As shown in the research of Alturki and Aldraiweesh (2021), LMS tools made it more accessible for students and teachers to attend lessons from home and offered better access to materials, better communication, and better engagement during classes. This offered students convenience and continuous access to educational resources. Nonetheless, a study carried out in Pakistan pointed out significant issues like poor internet connectivity, lack of appropriate technological devices, low levels of student participation, and absence of physical classroom engagement that negatively impacted the learning experience (Adnan & Anwar, 2020).</p> <p>E-learning systems were created based on the Self-Determination Theory can effectively promote autonomy, competence, and relatedness, which are three critical components that enhance the user’s engagement and satisfaction (Liu & Correia, 2021). The results from the study indicated that properly designed systems not only enhanced engagement but also increased the completion and active participation rate among students regarding course activities.</p>	
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	<p>In the rapid advancements of technology, the need for digital learning highlighted the need for a digital learning platform across educational institutions. Cavite Science Integrated School is a public school, specializing in science, technology, and mathematics education. However, the Cavite Science Integrated School faces significant challenge when it comes to provide learning processes and equal opportunity to education to students. Furthermore, these constraints include limited access to digital devices, poor internet connectivity, and lack of institutional support, hinders the teaching and learning capability, makes it harder for the school to fully support the needs in the education towards senior high school students. With EduConnect, this is the platform solution for addressing the gaps for the school lacks by providing a digitalized and interactive platform to streamline and speed up the manual processes what traditional learning does (manual distribution of modules, activity submissions, quiz management, and analytics reporting). To provide an accessible and user-friendly platform for the school, EduConnect empower teachers to manage classrooms with more efficient while students engage in course learning anytime, anywhere. As a result, this platform enhances interaction and participation, provide feedback loops, and boosting the school's strength to handle and deliver high quality education, despite the existing resource limitations (Baticulon et al., 2021).</p> <p>Given these challenges in public education, EduConnect is proposed as a comprehensive digital e-learning system specifically designed to support</p>	
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	<p>asynchronous classes for senior high school students. Its intended scope is to improve advanced learning by offering well-organized, immersive, and adaptable content on different subjects and learning tiers. EduConnect will provide students with an interactive learning environment in which they can view lessons, modules, assessment submissions, and be part of class dialogues. A personalized student dashboard will include elements such as student dashboard displaying upcoming tasks, deadlines, grades, reminders, downloadable materials, and motivational elements such as badges and leaderboards to encourage engagement and progress.</p> <p>For educators, EduConnect offers a teacher account with a classroom management dashboard, feedback system, and content authoring tools to create, schedule, and manage lessons, quizzes, modules (PDFs/images), and announcements. The web-based admin interface will help administrators by providing them with capabilities for performance metrics, course monitoring, and user administration. Real-time data on system usage, academic achievement, and student involvement are included in this.</p> <p>EduConnect adheres with the UNSDGs (United Nations Sustainable Development Goals), mainly SDG 4 on Quality Education, promoting accessible, self-paced digital learning (United Nations, 2022). Furthermore, the platform supports SDG 9 on Industry, Innovation, and Infrastructure by applying cloud integration and interactive modules to enhance the effectiveness of digital infrastructure for education (United Nations, 2025). Lastly, with SDG 10 on</p>	
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Reduced Inequalities, the EduConnect offers equal access to e-learning systems to everyone regardless of background (United Nations, 2025). With these standards in SDG, EduConnect will bridge the educational gaps and bring a sustainable and innovative platform with equal opportunities towards digital learning.

Objectives of the Study

The main objective of this study is to design and develop EduConnect: A Digital E-Learning System tailored for asynchronous classes of senior high school students, providing a structured, interactive, and accessible learning experience. Specifically, it intends to:

1. Design a web-based platform with features including:
 - a. Account registration and login system for students, teachers, and super administrators.
 - b. Password reset and recovery functionality for accessibility.
 - c. Personalized student dashboard displaying upcoming tasks, deadlines, grades, downloadable materials, badges, leaderboards, notifications, and progress tracking.
 - d. Course and module management tools for organizing lessons, quizzes, assignments, and downloadable learning content.
 - e. Task upload and submission system that allows students to submit assignments and quizzes directly through the platform.
 - f. Profile management panel allowing users to update their personal and account information.
 - g. Session control module including secure logout functionality for all user types.

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	<ul style="list-style-type: none">h. Teacher dashboard for classroom management, including features for monitoring student performance, analyzing participation, bulk uploading of quizzes, archiving assignments and quizzes, handling enrollment of students that can also be supplemented with bulking of enrollment of students.i. Content creation tools for teachers to schedule lessons, upload modules (PDF/image), quizzes, and announcements.j. Feedback and monitoring system allows teachers to provide personalized comments and track student interaction and participation.k. Forum feature where students can create posts (questions, discussions, or text-based inputs), while teachers have moderation privileges limited to deleting inappropriate or irrelevant posts.l. Super Admin panel for managing users (add, update, deactivate, or delete accounts), moderating user-generated content, and overseeing platform activities.m. Analytics and reporting dashboard for monitoring performance metrics per student, class, and subject, including progress status and engagement rates.n. Bug reporting module to allow users to report technical issues directly to administrators.	
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	<ul style="list-style-type: none">o. Super admin toolkit for managing system-wide operations, resolving technical concerns, and handling account recovery requests.p. Privilege management features to assign, modify, or revoke admin-level access permissions. <p>2. The system will be developed with a front-end build using HTML, CSS and JavaScript, while Node.js will be used as back-end build, including Visual Studio Code and.</p> <p>3. Conduct functionality and compatibility testing and evaluate system performance using ISO 25010 framework based on the following metrics:</p> <p>ISO 25010:</p> <ul style="list-style-type: none">a. Functional Suitabilityb. Performance Efficiencyc. Compatibilityd. Usabilitye. Reliabilityf. Securityg. Maintainabilityh. Portability	
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	Significance of the Study <p>EduConnect’s development aligns with the goals of Cavite Science Integrated School of teaching, research, and community outreach through offering a new and engaging platform that complements the system design for senior high school student. EduConnect is a digital system that enhances student learning engagement, streamline teacher workload, and improves the school’s capacity for data-driven decision making. This motive is taking action by converting traditional paper-based modular learning into a digitalized platform with the features made easier for students and teachers.</p> <p>Students – EduConnect is used by the senior high school students who enrolled in Cavite Science Integrated School. This motivates students to access learning modules, submit activities and assignments, progress tracking, and receive real-time feedback. Badges, leaderboards, and interactive modules include these features to increase their engagement, enhance self-paced learning, and build digital literacy skills to prepare students’ talents and specializations to academic success and future careers.</p> <p>Teachers or Faculty – The platform offers a teacher portal with an intuitive classroom management dashboard, allow module uploads, schedule lessons, create quizzes, monitor student performance, and provide targeted and real-time feedback aligned with the vision and mission of Cavite Science Integrated School. This</p>	
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	<p>reduces manual workload, faster content distribution, and gives priority to focus on student engagement for teachers.</p> <p>School Administrators – EduConnect offers a web-based admin portal to manage user accounts, module uploads, announcements, and analytics. Administrators can track school activity, identify learning gaps, and ensure relevance and quality of the educational contents.</p> <p>Future Researchers – This study provides an example model for future research in creating cloud-integrated, multimedia-rich learning management system. It presents a replicable development process, evaluation framework (ISO 25010), and measuring metrics that can be used as a starting point to future innovation wishing to enhance interactive educational technology.</p> <p>Scope and Limitation</p> <p>This research aims to design and implement EduConnect: An E-Learning System for Senior High School Students of Cavite Science Integrated School, Maragondon, Cavite. The proposed platform is a web-based system specifically developed to facilitate asynchronous classes for senior high school students. The system will provide a comprehensive and modern learning environment by transforming the traditional, paper-based modular approach into digitalized instruction modules. The core functionalities will cover a personalized student dashboard to track progress, a teacher dashboard for classroom management, and a</p>	
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	<p>web-based admin interface for high-level oversight. The system will authorize the teachers/faculty with content creation and schedule lessons, upload modules like PDF and images, manages quizzes and announcements and posting in forums. Students will improve from features like upcoming task reminders, progress rewards, badges, and leaderboards to increase engagement and motivation.</p> <p>However, this research has several defined limitations to ensure a focused and achievable project. EduConnect's content delivery will be limited to its core learning modules and will not encompass the advanced, specialized topics or an extensive array of features found in larger, commercial learning management systems. The administrative and content management functionalities are exclusively available on the web-based application for the client or designated faculty and are not accessible to students. Another limitation is that essays and assignments require manual grading, while quizzes are automatically graded. Furthermore, the platform's communication capabilities will be limited, lacking the features for messaging or private conversations of the users. In addition, the system will not support the direct uploading of video content, limiting multimedia resources to externally hosted materials. The system will also not include a formal viewing of grades, as its main purpose is to facilitate the viewing of learning modules, submission of assignments, and completion of quizzes. Although the learning modules promote a collaborative environment, only teachers have the ability to edit and manage the content, while students are restricted from making changes to the entire module.</p>	
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CHAPTER II

REVIEW OF RELATED LITERATURE

Literature Review

This section reviews the existing literature regarding web-based learning systems, centralizing the way to enhance digital learning platforms, particularly in paper-based module learning. The review is categorized under six themes: Browser-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 Web-Based System

Many web-based learning systems can offer wide audience accessibility to both desktop and mobile web browsers, strengthening educational discipline by providing learning resources online. “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 EduConnect’s goal to ensure elevated access through a responsive, accessible, and user-friendly platform design, tailored to learn students in completing school-related learning tasks using any device with an internet browser

Impact of Web-Based Systems

Many educational contents through browsers on multiple devices have a big influence on students' behavior, learning preferences, and skill development. According to Chinamasa and Ncube (2023), e-learning platforms affect students' preferences by offer excellent usability, interactive features, and pertinent information. Targeting senior high school subjects and courses, this is in line with EduConnect's objective to improve learning through engaging features, individualized modules, and intuitive navigation that can be adapted for web and mobile browsers.

Benefits of Web-Based Systems

If the developed and implemented web and mobile-based websites are consistent, this will give great advantages both for personal self-growth and academic achievements. Banihashem et al. (2022) highlighted e-learning platforms with a constructivist design proves that students improving their knowledge and learning outcomes due to interactive modules inclusion. This supports EduConnect's objective to provide integrated structured modules, quizzes, and real-time feedback, enhancing deep engagement of learning content for senior high school students, implement forum discussions, monitor their progress, and build their competencies in a self-paced and interactive environment.

Type of System: Learning System

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.

Web-Based Learning System

Web-based learning allows students to access anytime and anywhere on the go for self-paced learning regardless of their location, Santiago et. al (2021) stated that web-based learning integrates accessibility to education and learning style extensions, increasing the students' learning pace. EduConnect adopts this approach to access modules, assignments, and interactive in mobile devices, providing continuous learning beyond one placed environment.

E-Learning System

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 EduConnect'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.

Multimedia Integration in E-Learning System

Multimedia-enhanced systems can integrate multimedia file types like text, audio, and video to elevate the learning system for better learning retention and immersive experience. In a learning environment, Dritsas et al. (2025) support the use of multimedia types in digital e-learning systems because integrating with it can promote better student engagement and retention. This concept applies with EduConnect's task to make lessons more meaningful with multimedia files with modular challenges and real-time feedback to increase the interaction time with the content.

Interactive Learning System

Inversely to passive learning, an interactive learning system gives way to promote active involvement of learners with the building team of collaborators and fostering deeper understanding of the subjects. Dewi, Zaim, and Rozimela (2022) stated that interactive digital e-learning modules enhance student engagement and comprehension. Correspondingly, Darejeh, Mashayekh, and Marcus (2022) said that cognitive-based method integration in e-learning modules enhance students' problem-solving skills and retention. This applies to EduConnects's integration to

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	<p>build an e-learning system with gamified modules such as fostering 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 learn the subject lessons. (González-Carrasco et al., 2021).” EduConnect offers cloud service to access and use the learning modules from mobile devices.</p> <p>Modular Learning System</p> <p>EduConnect is designed as a modular learning system that provides educational content in small and manageable groups, allowing students to learn at own pace. This ensures that they don’t feel overwhelmed and can learn one lesson after another before proceeding. Serrano (2023) pointed out the importance of having a modular learning system, to recognize its incremental process for delivering content. This lets students focus on learning topics at their desired pace.</p> <p>Self-Paced Learning System</p> <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</p>	
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	<p>engagement, reduce cognitive load, and influence actions from learning outcomes.</p> <p>This supports EduConnect’s motive to create an e-learning system with lesson module access, take quizzes, submit assignments and tasks, and progress and grade tracking.</p> <p>E-Learning through Project-Based Learning</p> <p>Improving self-discipline and skills are essential to build an e-learning system dedicated to paper-based moudles. Awamleh (2021) pointed out the effectiveness of project-based e-learning systems to increase learners’ study and applied knowledge. EduConnect implements a similar approach by integrating lessons by incorporating challenges and assignments with active participation, enabling real-time feedback and iterative times to train the essential skills for self-growth.</p> <p>Quiz, Assignments and Essays</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 general e-learning systems to become tools for sharpening and building up the skill capabilities to the limit with their acquired knowledge. EduConnect integrates with the system to challenge students’ efforts of learning skills from lessons, essays, and quizzes, ensuring a complete approach to learn and improve.</p>	
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Dashboard Progress

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 EduConnect's objective to look at their lesson progression, quiz scores, and milestones for improvement.

Functionality

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. EduConnect organizes the interface into a neat and intuitive UI for lessons, quizzes, and essay writing. This can do most basic tasks as well such as login function, view dashboard statistics, access learning modules, and submission of outputs without errors.

Aesthetics

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

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	<p>of public-school branding designs 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. EduConnect 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 (2023) pointed out that the development costs and maintenance costs can be considered. EduConnect is a cost-effective system that uses paid scalable resources like cloud storage for development while providing them with high-quality learning experience.</p> <p>Scalability</p> <p>Scalability is crucial to e-learning system as number of users is increasing and we need to expand the contents by updates and maintenance. Kolodziejczak, Wojciechowicz, and Grabias (2025) noted that scalability must have resilient</p>	
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	<p>system architectures to continue evolving with new features while maintaining stability and efficiency. EduConnect implements cloud-based systems using Firebase, to expand the overall content and manage high user loads, and store large content storage, 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. EduConnect uses this coding editor for web development to admins with working functionalities and neat webpage design.</p> <p>Firebase</p> <p>Firebase is a cloud-based platform for application development that provides backend services such as real-time databases, authentication, and cloud storage and supports mobile and web-based system. González-Carrasco et. al (2021) pointed out that Firebase serves as a tool for scalability to digital learning systems. EduConnect used this tool to handle user data, track progress, and repository storage. Correspondingly, Ulfa, Santoso, and Azie (2024) used the integration Firebase for their web-based information system, providing real-time data access,</p>	
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	<p>backend handling, and cross-platform compatibility. With Firebase, EduConnect use this platform to secure user authentication, account management, and track students' progress in real-time, ensuring system stability, seamless synchronization of learning times and activities across mobile and web-based devices.</p> <p>Furthermore, Firebase can handle cloud storage for uploading multimedia content such as PDFs, images, texts, videos, and other interactive resources to provide safe and secure content for file retrievals. This backend tool provides not only scalability but also giving them responsive, secure, and stable learning experience for all users.</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. EduConnect employs these to create a frontend interface for web version of the system, making it more appealing and accessible, especially to the functionalities.</p>	
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Standard Metrics Used

ISO 25010 (Software Quality Evaluation Standard)

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. EduConnect will be evaluated against the standard to meet the highest quality criteria.

RELATED STUDIES REVIEW

E-Learning Systems Functionality (Ndirangu et al., 2022)

Research by Ndirangu et al. (2022) on the essential functionalities of an efficient e-learning system was carried out. They listed essential functions that are important in terms of user satisfaction and effective learning success, which encompass intuitive navigation, strong content management, and credible performance. Their study emphasized that the functionality of a system must promote the educational process directly, such that it is simple for both students and teachers to work with the content as well as their assignments. The findings of the study emphasize having a well-planned and interactive platform to create a good and productive learning environment.

This study directly applies to the design of EduConnect's web-based system. By emphasizing clear navigation for students and administrators alike, the system is designed to fulfill the requirements for a positive user experience. The focus on

strong content management, such as uploading and structuring modules, quizzes, and announcements, applies to the study's suggestion for a system that accommodates smooth educational process flow.

E-Learning System Design in Schools (Iskandar et al. 2023)

Iskandar et al. (2023) showed that the development and design of high-quality e-learning systems for use within school settings. Their research stressed the need to have a specialized development approach to produce user-centric and highly functional educational systems. The findings of the research specifically highlighted the need to employ the use of a robust and specialist development environment for developing applications that are optimized and reliable to use on different devices.

This study closely supports the EduConnect development strategy, affirming the decision to employ contemporary web technology and a methodical development process. The results affirm that prioritizing a high-quality, purposeful design is essential in building an efficient learning environment for high school students. This guarantees that the system is not just operational but also reliable and user-friendly for all three types of users.

Constructivism Approach Integration (Kristanto, A., 2021)

Kristanto (2021) discussed integrating a constructivist approach in designing e-learning platforms. It has been revealed through the study that systems that facilitate active learning, problem-solving, and collaboration develop a better

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	<p>conceptual understanding compared to rote memorization. The study emphasized that characteristics that enable the students to communicate with the material and with their peers, like forums or common galleries, play a central role in developing an environment that is conducive to learning where students can construct their own knowledge actively.</p> <p>This research aligns with EduConnect's design philosophy to establish a collaborative environment. The platform incorporates a platform for user interaction and sharing, aligned with the constructivist approach. This component is expected to go beyond passive learning through engagement with and contribution to the educational content by the students, hence enhancing their understanding and academic involvement.</p> <p>Using Open-Source Desktop App for E-Learning (Marticorena-Sánchez et al., 2022)</p> <p>Marticorena-Sánchez et al. (2022) discussed the application of open-source desktop software in e-learning. Based on the research, it was determined that open-source technologies are an effective and affordable means of creating learning tools, especially when the platform demands high levels of customization and flexibility. The study also observed the advantages of desktop-based e-learning, including improved performance and offline access, which can be of vital importance for users with restricted internet connection.</p> <p>Although EduConnect is an online application, the research findings of this study concerning the advantages of flexible and tailored development are the most</p>	
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applicable. Application of Firebase as a backend technology, with its scalable and flexible nature, provides the level of flexibility and expansion that open-source systems provide. This technological selection strategy provides assurance that EduConnect can be tailored to the exact user requirements and scale without any meaningful performance degradation.

Dynamics of E-Learning at Higher Education (Muhammad, R. et al., 2022)

Muhammad, R. et al. (2022) showed the dynamics of an e-learning in higher education. The study highlighted the need for balancing flexible, asynchronous learning with elements that preserve student engagement and motivation. Their report indicates that although the convenience of asynchronous platforms is superb, they should be complemented with motivational aids, like monitoring of progress, and well-defined, structured learning pathways to avoid isolation or being left behind by students. The research has pinpointed the requirement for a system with both autonomy and structure.

This study gives sound basis for the design of EduConnect. The system is based on an asynchronous model in order to grant learners flexibility, but it also incorporates aspects to stem the motivational issues raised in this study. Application of leaderboards, badges, and tracking of progress comes as a direct answer to the demand for engagement tools in a manner that guarantees learners stay motivated and on course in their learning process.

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	Flexible Learning Adaptability to E-Learning Systems (Santiago Jr. et al., 2021) Santiago Jr. et al. (2021) showed the implementation of e-learning systems to support flexible learning and expand learning styles. Their work emphasized the need for a platform where students could access learning material "anytime and anywhere." The freedom, they discovered, is required for students with different schedules and engagements because it shows them to learn more independently at their own pace and time. This method not only enhances the speed of learning but also helps the student autonomy and self-directed learning. This finding is a straight affirmation of the fundamental design of EduConnect as an online platform. The findings of the study confirm that a system of offering asynchronous, on-demand learning access to instructional materials is essential for accelerating learning pace and meeting the varied schedules of senior high school students. This approach promotes student autonomy, a critical ability for successful learning.	
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Synthesis

The literature reviewed and supporting studies ensures a solid academic basis for the development and implementation of EduConnect, an internet-based e-learning platform. Collectively, the studies emphasize that an effective online learning platform needs to combine strong functionality, good pedagogical practice, and adaptable technical architecture. The synthesis reaffirms how the research outcomes justify the conceptual framework of EduConnect, ensuring its development into an efficient, user-friendly, and scalable tool for senior high school students.

The pedagogical framework for EduConnect has firm support from learning dynamics and adaptability research. The results of Santiago Jr. et al. (2021) and Muhammad et al. (2022) emphasize the value of an adaptive, asynchronous learning framework to cater to heterogeneous student schedules and avoid burnout. In response to the possible student isolation with asynchronous settings, EduConnect's framework integrates motivational components such as badges, leaderboards, and progress markers in direct response to the suggestions of Muhammad et al. (2022). In addition, the system's interactive quizzes adhere to the constructivist philosophy espoused by Kristanto (2021) and Tjahjammorniarsih et al. (2023) and encourage active learning and more meaningful understanding of material rather than passive memorization.

Technically, the architecture of the platform is amply supported by research in system design and functionality. The exigency of a platform that is intuitive,

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	<p>well-designed, and interactive, as highlighted by Ndirangu et al. (2022), determines the creation of EduConnect's user-focused dashboards for students, teachers, and administrators. The use of a contemporary web-based system and a systematic development process is justified by Iskandar et al. (2023), who emphasize the need for an expert approach to develop efficient and dependable applications. The utilization of Firebase as a backend infrastructure meets the scalability and flexibility requirement, an idea underpinned by Marticorena-Sánchez et al. (2022), so that the platform can expand to serve the needs of a growing user base without compromising on performance.</p> <p>In summary, the integration of these studies verifies that design decisions by EduConnect are not random but are rooted in proven educational and technical research. Through integration of an asynchronous model, motivational and collaborative functionality, and a base in scalable, stable technical infrastructure, EduConnect is capable of being a deliberate and effective means for enhancing academic learning, beyond the weaknesses of conventional, general e-learning systems.</p>	
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Conceptual Framework

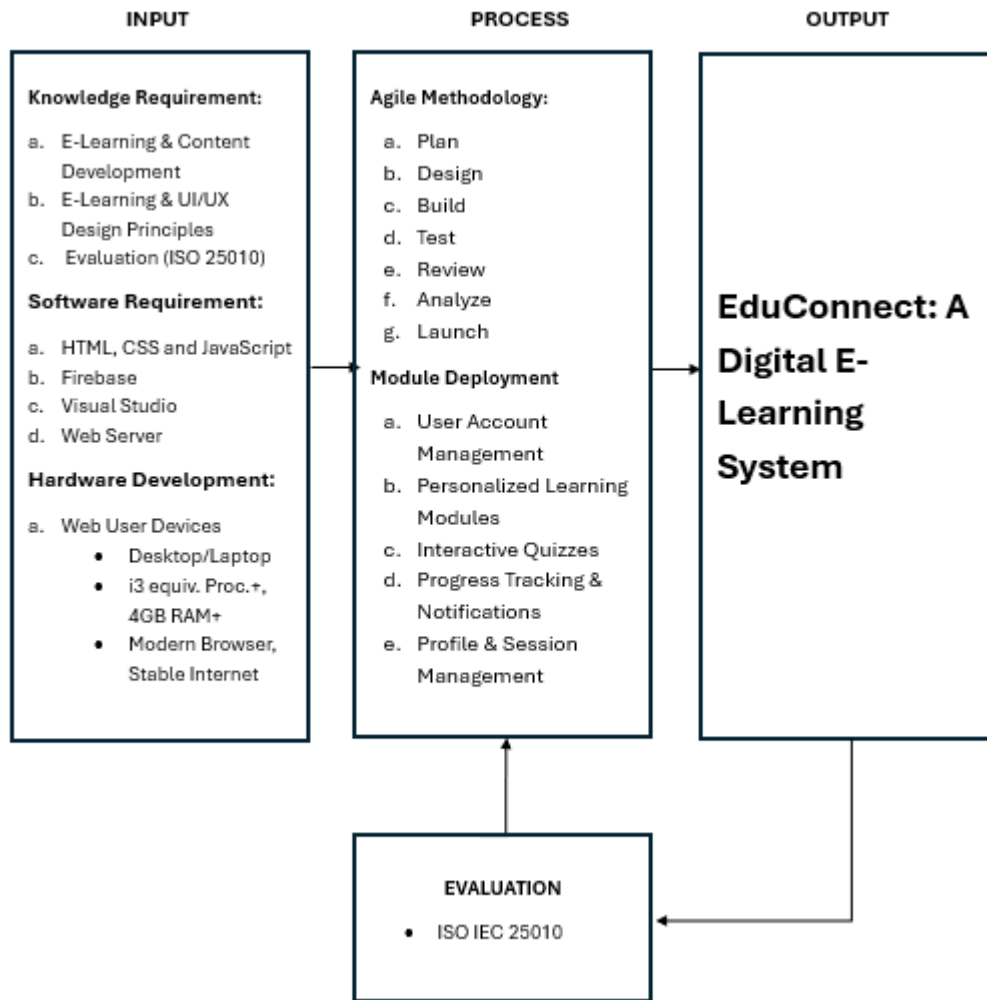


Figure 1. Conceptual Framework of the EduConnect: An E-Learning System for Senior High School Students of Cavite Science Integrated School, Maragondon, Cavite

During the Input stage, the required requirements for successful development of EduConnect: An E-Learning System are outlined. Knowledge needs include experience in e-learning pedagogy and content development, and skill in designing e-learning platform interfaces and user interface/user experience

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	<p>(UI/UX) concepts. This stage also involves familiarity with system evaluation methods such as ISO 25010 frameworks. Software Requirements enumerate the requisite development tools and platforms, e.g., 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 desktop/laptop computers with sufficient processors and RAM, recent web browsers, and reliable internet connectivity.</p> <p>The Process area describes the arranged process of building EduConnect: An E-Learning System and its key features. Development follows Agile Methodology, an iterative process that includes cycles of discussion, thorough plan, design, build, test, review, analyze and launch to reflect ongoing improvement and flexibility. Module Deployment outlines the major features incorporated into the EduConnect system. This encompasses user account management (sign-up, login, profile), personalized learning modules, interactive quizzes for practical application and for testing knowledge, 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 EduConnect: An E-Learning System, designed to allow students to better their learning experience. 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

For the readers to fully comprehend this study, the following are the notable terms that have been utilized in the study:

Agile Methodology – Agile Methodology is a method of software development that is an iterative and progressive, it focuses on collaboration and flexibility of functional pieces through ongoing cycles of planning, analysis, design, implementation, and testing.

EduConnect– A web-based e-learning system created for educational institute to promote the digitalization of learning modules for students and teachers to enhance their accessibility, engagement, and learning processes.

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.

Firebase – A full-featured web and mobile app development platform from Google, used as the backend service of EduConnect, with features such as real-time database, authentication, and cloud hosting.

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	<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 system’s environment, organized to sequentially instruct particular digital learning material principles and capabilities through lessons, illustrations, and embedded quizzes.</p> <p>Web-Based Platform – A computer program that is accessed through a web browser on the internet, used in the system for the management control (Admin Portal) and technical support activities (Super Admin 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 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).

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 questionnaires, and established evaluation frameworks. These discoveries will directly guide incremental improvements inside the Agile cycles.

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	<p>The researchers anticipate that the research and development methods outlined above help achieve a practical, user-oriented digital e-learning platform, ultimately being part of EduConnect’s development. Through basing 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, especially the quota sampling method. Purposive quota sampling is a non-probability sampling technique in which the researcher specifically chooses participants according to the predetermined standards 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 sample groups range from the primary educational beneficiaries (students, faculty), administrative oversight (super admin) 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 EduConnect: An E-Learning System for Senior High School Students of Cavite Science Integrated School, Maragondon, Cavite are constituted within the target users of the application. These include:</p> <p>Senior High School Students (Grades 11 and 12) will be the primary users for the system to test the main features such as module access, assignment submissions, schedule and announcement viewing, and progress tracking through personalized dashboard.</p> <p>Instructors or Teachers who handle different subject areas will test the features to the Teacher portal such as add students in classroom, lesson upload, quiz creation, module scheduling, and classroom management dashboard. They also assess the system to ensure the platform’s alignment with curriculum requirements, ease of use, and effectiveness in asynchronous instruction.</p> <p>School Administrators, including the Super Admin will access the web-based admin portal and assess the functions such as user account management, analytics viewing (login times, number of students, number of teachers), and content monitoring. This will assist in the platform assessment to support system efficiency and administrative needs.</p>	
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Research Locale

EduConnect system development and implementation will be conducted in a Cavite Science Integrated School, with a certified partnership with COSEL. The selected school was Cavite Science Integrated School, located in Maragondon, Cavite chosen for its commitment to give learners a high-quality education regardless of their socio-economic backgrounds and for its openness to technology-driven educational solutions.

Cavite Science Integrated School currently rely on paper-based modular learning, proves to have a challenge to printed module distribution, manual labor of handling and checking outputs, and limited engagement between students and teachers. EduConnect is designed to change paper-based learning mode into a digitalized learning app, tailored for students to access modules, submit assignments, and receive real-time feedback through mobile devices. A web-based admin portal will be handled by faculty to upload modules, track students' progress, and manage announcements.

The Cavite Science Integrated School was selected as the research locale due to its emphasis on offering dynamic, student-centered learning experiences and its receptiveness to technology-driven learning solutions. Examining the EduConnect system's usability, effectiveness, and educational value was made possible by the school's varied student body. Through the system's implementation

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	<p>the school, the researchers were able to gather relevant feedback from a broad range of users, including the administrators in technology management, teachers managing learning content, and students with different degrees of familiarity with digital learning tools.</p> <p>Research Instrument</p> <p>The main research tool used by the researchers to evaluate the efficacy, usability, and overall experience of the EduConnect system was a questionnaire based on the and the ISO/IEC 25010 Software Quality Model, which evaluated important elements such as functionality, engagement, and aesthetics.</p> <p>The surveys alongside the user experience testing will serve as the main research tools to assess the effectiveness of the e-learning system (LMS) and its impact on the learners' experiences with the system. These assessment instruments will aim to collect information on the effectiveness of the system as far as its engagement and satisfaction metrics with the respective users are concerned. Participation of the students will be based on the perception as well as the behavior with the use of the LMS and will include navigation, content access, engagement, and learning results.</p>	
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Table 1: 4-Point Likert Scale

Numerical Rating	Equivalent
1	Not Acceptable
2	Somewhat Acceptable
3	Acceptable
4	Very Acceptable

Table 1 represents the testing and evaluation of the effectiveness of an LMS in terms of engagement, satisfaction, and learning outcomes. It uses a 4-point Likert scale, which rates responses from “Not Acceptable” (1) to “Very Acceptable” (4), ensuring clear positive or negative feedback without a neutral option.

Data Gathering Procedure

Data gathering for EduConnect 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, and instructors. The proponents use both qualitative and quantitative methods to gather relevant data and support the system’s design.

1. Preliminary Research

Relevant data have gathered through review of related literature and research existing e-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 EduConnect app. These are important to gather what are the requirements of the system like UI/UX design, app features, etc.

3. Direct Observation

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.

4. System Testing and Feedback

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 EduConnect for development.

5. Evaluation and Documentation

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.

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, 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 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.
6. **Analyze** – Utilize ISO 25010 frameworks to quantify system quality, levels of engagement, aesthetics, and dependability.

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Determine areas of improvement and verify effectiveness of the platform.

7. **Launch** – Formulate release of EduConnect to the public by making it accessible to everyone. Offer onboarding support for students and teachers, super admin, and ongoing surveillance for continuous improvement.

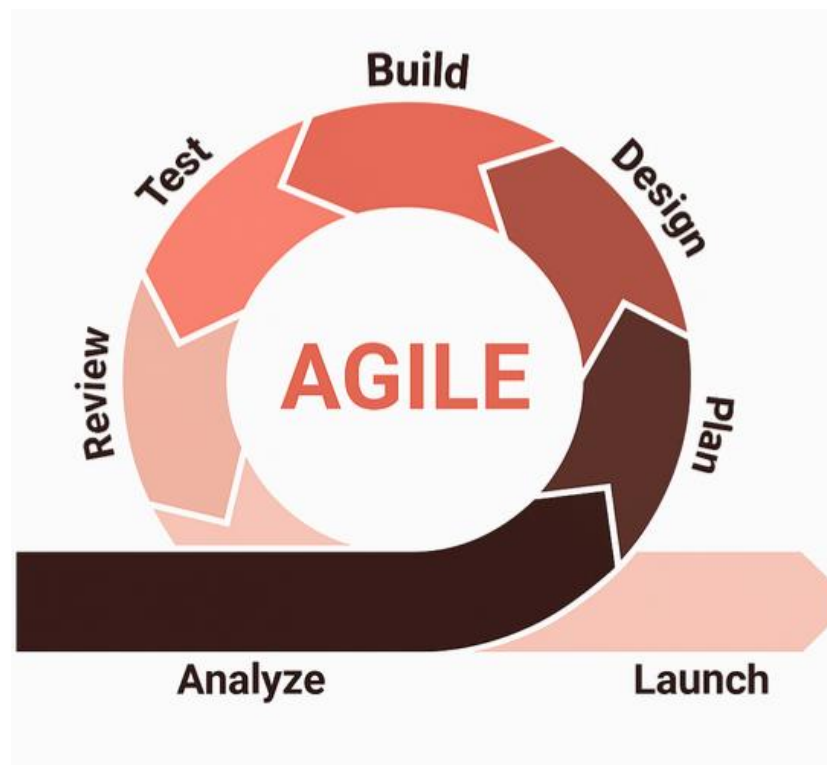


Figure 2. SDLC Figure of the EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite

System Architecture

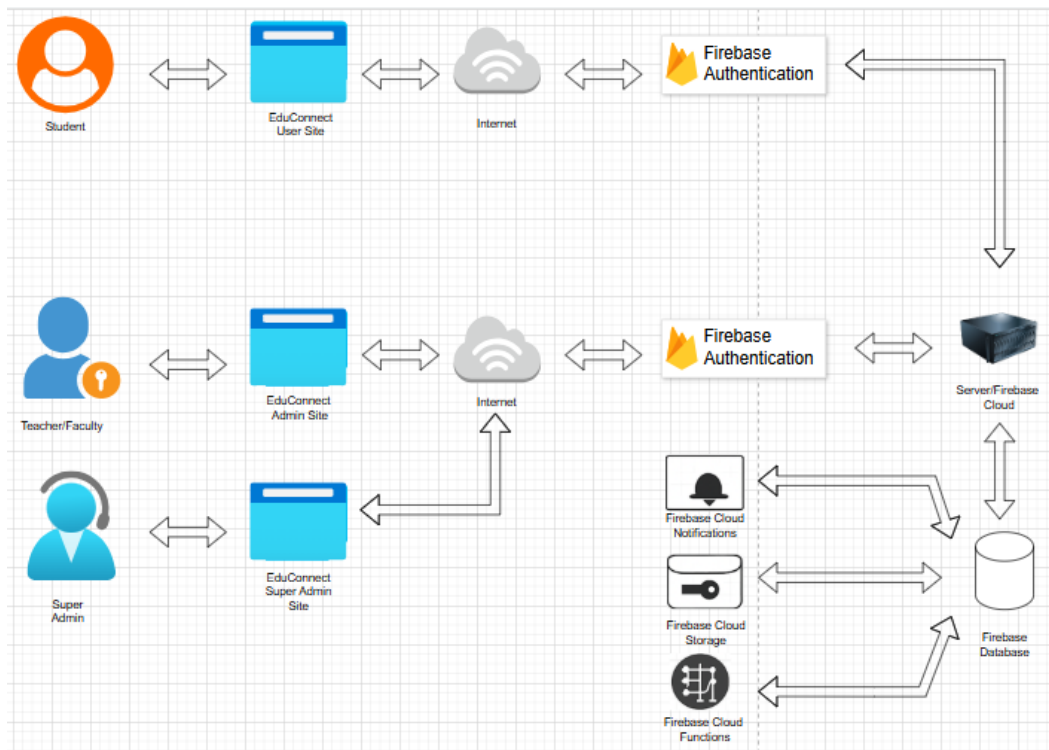


Figure 3. System Architecture for EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite

The architecture of EduConnect was designed as a web-based application that utilizes Firebase as its backend infrastructure. EduConnect implements a client-server model with three primary user types: Students, Teachers/Faculty, and a Super Admin. The student side provides access via a web-based application, which will give learners a platform for educational journeys. The administrative staff, which includes Teachers/Faculty and the Super Admin, handles and overlooks user accounts, educational course materials, and content management via web browsers. This architecture allows consistent interaction between all users and

system services with Firebase to take care of backend functions like authentication, content sharing, and real-time updates

Use Case Diagram

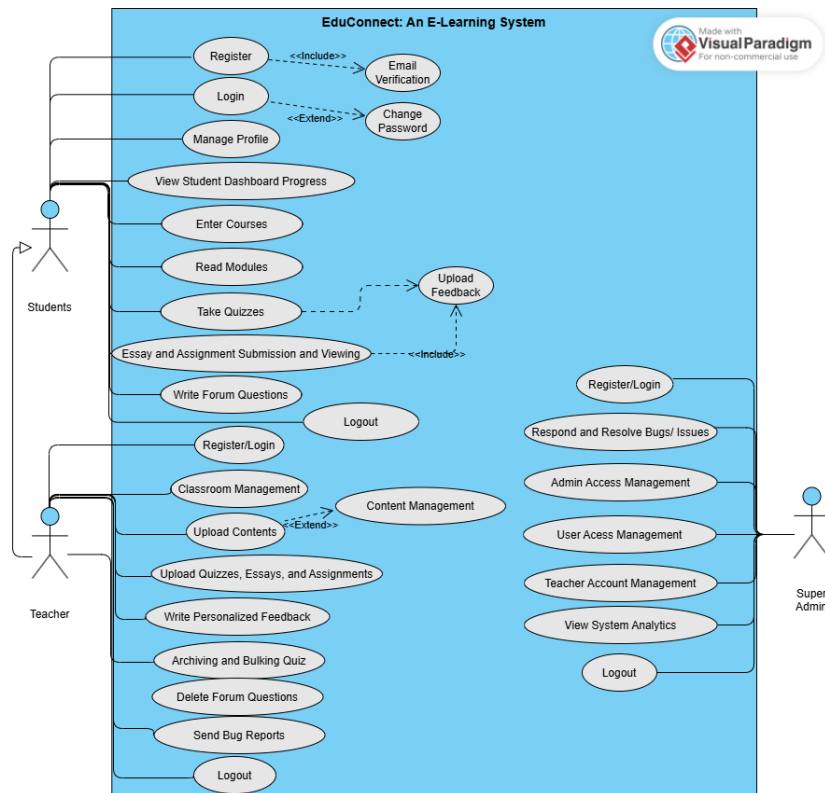


Figure 4. The Use-Case Diagram for EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite

Figure 4 represents the Use Case Diagram of EduConnect, showing the various interaction between users and its core functionalities. The system supports four main functions: the students, teachers, and super admin. Students can perform account registration with verification code, login access, change passwords, and

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	<p>profile management. They can also enter courses, read modules, take quizzes, submit essays and assignments, write forum questions and view their dashboard progress.</p> <p>Teachers can log in to their accounts in the same manner as students but with different approaches. They can inspect and manage classroom sections to students, uploading lesson resources, making quizzes, essays. and assignments, creating personalized feedback, bulking and archiving quizzes, content management, monitoring classroom discussions, writing personalized feedback, deleting forum questions from students, and sending bug reports happening in the system for Super Admin.</p> <p>Super Admins can login and register in a web-based admin portal to monitor system behavior, inspect activity of users, teachers, log sessions, and view platform engagement. They can manage user accounts (adding, modifying, deactivating, and deleting), view performance analytics happening to the students, classes, and subjects, moderate and manage user-generated content to adhere the compliance standards appropriate to education. 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.</p> <p>These tasks ensure the high standards and provide non-threatening content to show within the system. Overall, this diagram explains the functional boundaries</p>	
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of EduConnect system, showcasing how the service and feature interaction works with different user types.

Flow Chart

User Flowchart (Student)

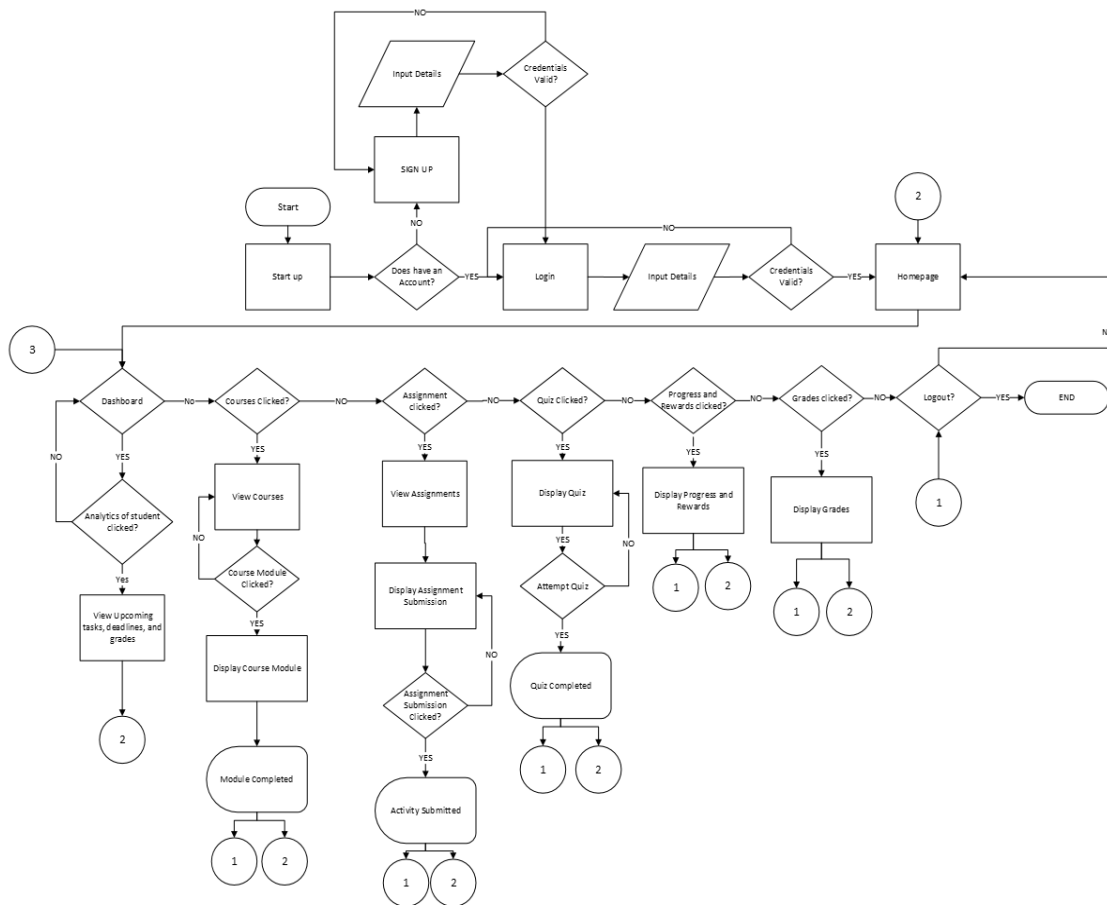


Figure 5. The Flowchart Diagram for EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite

For the complete detail please refer to the Appendix A.

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	<p>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 is verified, the users are directed to the dashboard or homepage where they can access a variety of options including browsing modules, viewing courses, submitting assignment, taking quizzes, and managing their own profile. Users can choose courses, view course modules, or answer quizzes that are provided by the admin. The system simplifies interaction by allowing users to post on a forum page to ask questions or send concerns to the teacher. Users can upload their work to their module. When the user signs off the system, the session ends.</p>	
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User Flowchart (Teacher)

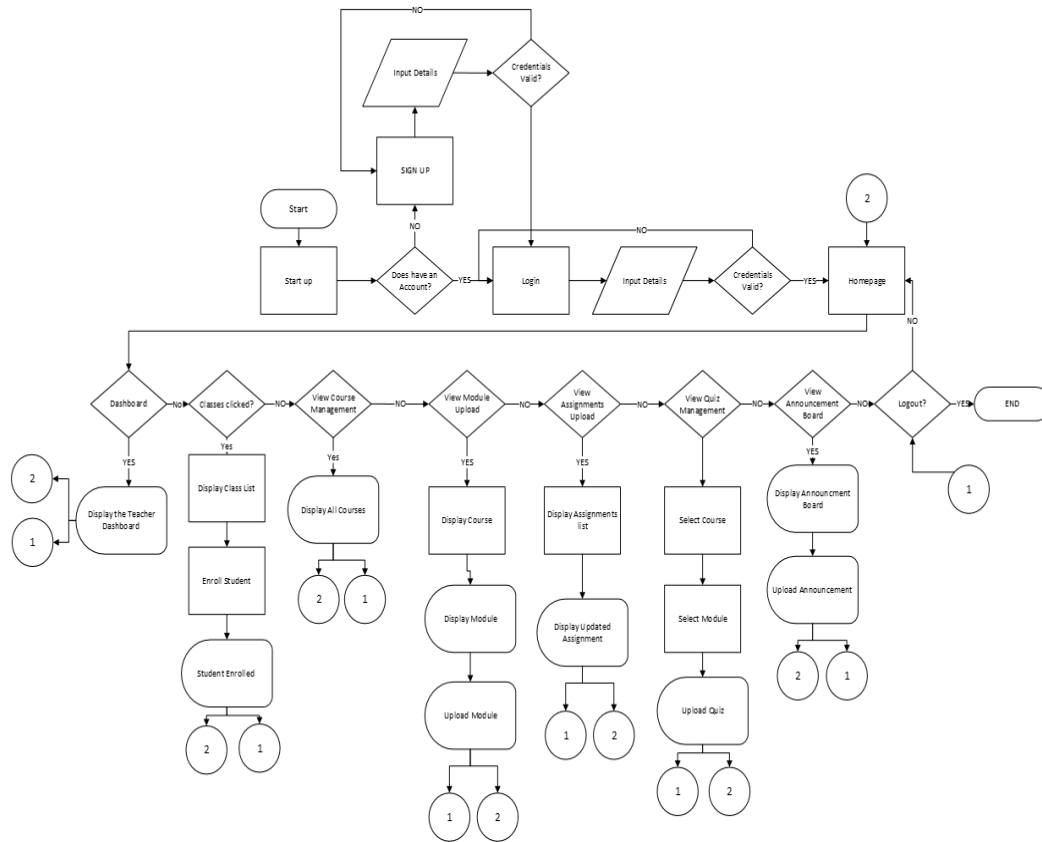


Figure 6. The Flowchart Diagram for EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite
For the complete detail please refer to the Appendix B.

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 teachers can now access the homepage where they can do various tasks. These include viewing analytics, managing classes, courses, modules, quizzes, and monitoring user accounts. Teachers can also create, edit, delete, and upload class, course, assignments and module contents as well as giving

users quizzes. The analytics show the user's performance and their engagement with the system. Teachers can also monitor and grade the assignments of users. The Teacher has the option to end their session by logging out after the tasks are completed.

User Flowchart (Super Admin)

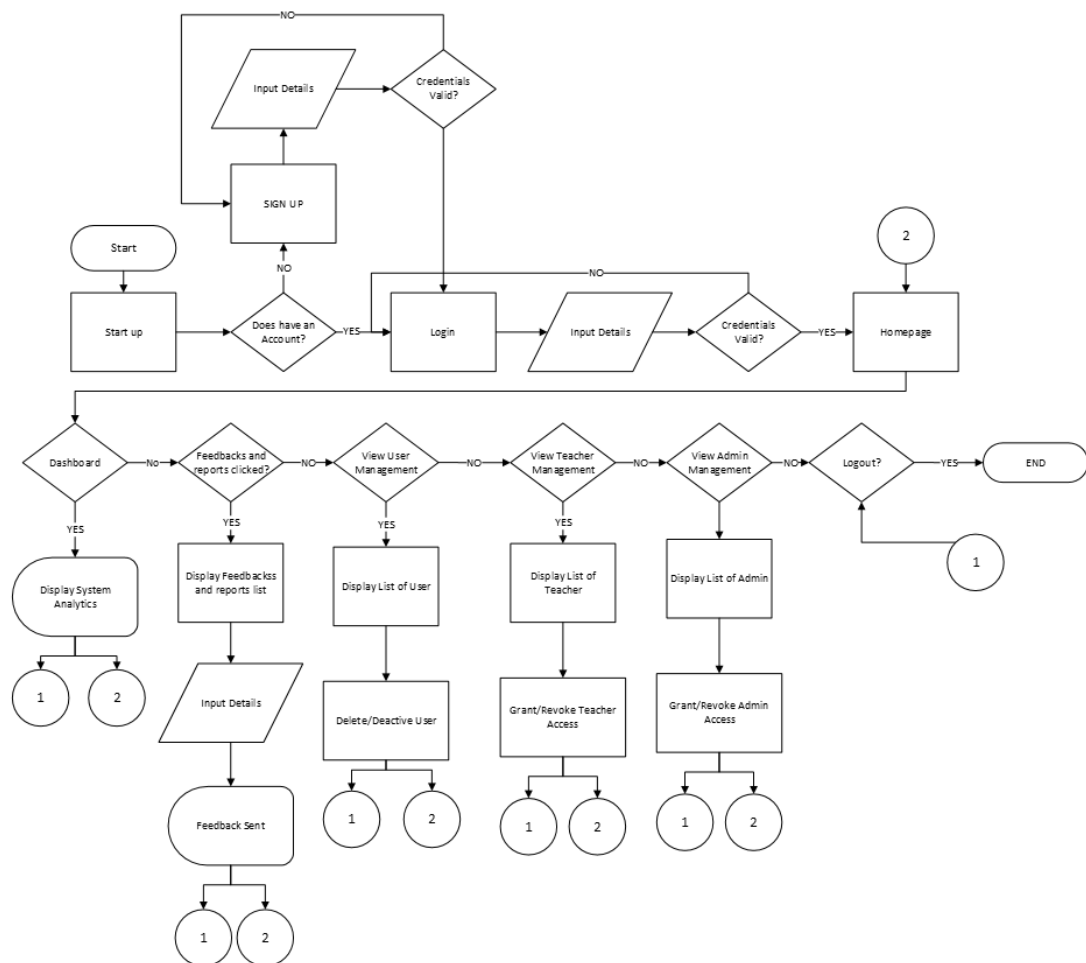


Figure 7. The Flowchart Diagram for EduConnect: An E-Learning System for Senior High Schools of Cavite Science Integrated School, Maragondon, Cavite

For the complete detail please refer to the Appendix C.

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Figure 7 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, and monitoring user accounts. The analytics show the user's performance and their engagement with the system. The feedback and reports can be viewed by the admin and sent a response for the feedback. Admins can also monitor the users, they can deactivate/delete users, grant or revoke teacher access, and grant admin access. The administrator has the option to end their session by logging out after the tasks are completed.

Data Analysis

The study will utilize quantitative methods for data analysis to measure the system's performance, usability, and impact on student learning outcomes. The evaluation involves using the pre-test and post-test survey results to measure improvements in students' familiarity and engagement with digital learning systems. A 4-point Likert scale will be used to measure the system's effectiveness, usability, and learning impact, rating from Strongly Dissatisfied (1) to Strongly Satisfied (4).

Ethical Considerations

Every IT research or capstone project requires ethical considerations to establish system development, system launch, and system evaluation respect the

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	<p>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 EduConnect is a safe and dedicated to all users selected with educational compliance. Here are the ethical considerations adhered for the development of EduConnect:</p> <p>1. Data Privacy and Confidentiality</p> <p>The development of EduConnect 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> <p>2. Informed Consent</p> <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> <p>3. Intellectual Property and Plagiarism</p> <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>	
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4. Cybersecurity and Protection from Harm

For IT-related systems, EduConnect 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.

5. Bias and Fairness

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 EduConnect for better features.

All these ethical considerations in EduConnect were applied with full responsibility, user agreements, and sharing broader technical system to other researchers in the future.

LITERATURE CITED

- Santiago, C. S., Jr, Ulanday, M. L. P., Centeno, Z. J. R., Bayla, M. C. D., & Callanta, J. S. (n.d.). *Flexible learning adaptabilities in the new normal: E-Learning resources, digital meeting platforms, online learning systems and learning engagement*. <https://eric.ed.gov/?id=EJ1332615>
- Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. *Frontiers in Education*, 10. <https://doi.org/10.3389/feduc.2025.1562391>
- Adnan, M. (2020). Online learning amid the COVID-19 pandemic: Students perspectives. *Journal of Pedagogical Sociology and Psychology*, 1(2), 45–51. <https://doi.org/10.33902/jpsp.2020261309>
- Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., Tiu, C. J. S., Clarion, C. A., & Reyes, J. C. B. (2021). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Medical Science Educator*, 31(2), 615–626. <https://doi.org/10.1007/s40670-021-01231-z>

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

Alturki, U., & Aldraiweesh, A. (2021). Application of learning management system (LMS) during the COVID 19 pandemic: A sustainable acceptance model of the expansion technology approach. *Sustainability*, 13(19), Article 10991. <https://www.mdpi.com/2071-1050/13/19/10991>

Liu, C., & Correia, A. (2021). A case study of learners' engagement in mobile learning applications. <https://eric.ed.gov/?id=EJ1334361>

Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., Tiu, C. J. S., Clarion, C. A., & Reyes, J. C. B. (2021). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Medical Science Educator*, 31(2), 615–626. <https://doi.org/10.1007/s40670-021-01231-z>

Phanphech, P., Tanitteerapan, T., Mungkung, N., Arunrungrusmi, S., Chunkul, C., Songruk, A., Yuji, T., & Kinoshita, H. (2022). An Analysis of Student Anxiety Affecting on Online Learning on Conceptual Applications in Physics: Synchronous vs. Asynchronous Learning. *Education Sciences*, 12(4), 278. <https://doi.org/10.3390/educsci12040278>

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

Katona, B., Venkataragavan, J., Nina, E., Ulrika, B., & Björn, O. (2023). Use of visual learning media to increase student learning motivation. *World Psychology, 1*(3), 89–105. <https://doi.org/10.55849/wp.v1i3.381>

Pérez, L. J., & Salvachúa, J. (2021). Simulation of scalability in Cloud-Based IoT reactive systems leveraged on a WSN simulator and cloud computing technologies. *Applied Sciences, 11*(4), 1804. <https://doi.org/10.3390/app11041804>

Alqurni, J. (2023). Assessing the usability of E-Learning software among university students. *International Journal of Information Technology and Web Engineering, 18*(1), 1–26. <https://doi.org/10.4018/ijitwe.329198>

Subaih, R. H. A., Sabbah, S. S., & Al-Duais, R. N. E. (2021). Obstacles Facing Teachers in Palestine While Implementing E-learning During the COVID-19 Pandemic. *Asian Social Science, 17*(4), 44. <https://doi.org/10.5539/ass.v17n4p44>

Chinamasa, E., & Ncube, M. (2023). FACTORS INFLUENCING E-LEARNING ACCEPTANCE IN TEACHER EDUCATION INSTITUTIONS: STUDENTS' AND LECTURERS' VIEWS. *International Journal of Education Humanities and Social Science*, 06(01), 80–93.
<https://doi.org/10.54922/ijehss.2023.0474>

Kristanto, A. (2021). Integration of a Constructivism Approach in E-learning Photography Subjects: Feasibility and Effectiveness in Learning. *Journal of Education Technology*, 5(2), 167–174.
<http://dx.doi.org/10.23887/jet.v5i2.33380>

Kołodziejczak, A., Wojciechowicz, E., & Grabias, P. (2025). *The Scalability of E-learning Platforms: The NAVOICA case*.
<https://doi.org/https://doi.org/10.29007/s8cb>

Darejeh, A., Mashayekh, S., & Marcus, N. (2022). Cognitive-based methods to facilitate learning of software applications via E-learning systems. *Cogent Education*, 9(1). <https://doi.org/10.1080/2331186X.2022.2082085>

Santiago Jr, C. S., Leah Ulanday, M. P., Jane Centeno, Z. R., Cristina Bayla, M. D., & Callanta, J. S. (2021). Flexible Learning Adaptabilities in the New Normal: E-Learning Resources, Digital Meeting Platforms, Online Learning Systems and Learning Engagement. *Asian Journal of Distance*

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

Education, 16(2), 38.

<https://asianjde.com/ojs/index.php/AsianJDE/article/view/580/355>

Katsaris, I., & Vidakis, N. (2021). Adaptive e-learning systems through learning styles: A review of the literature. *Advances in Mobile Learning Educational Research*, 1(2), 124–145. <https://doi.org/10.25082/AMLER.2021.02.007>

Tanwirulqulub, M. (n.d.). *Designing E-Learning Applications As An Android-Based Student Learning Media With The Waterfall Method*. 1, 2025. <https://doi.org/10.14710/jtsiskom.8.2.123-129>

Dewi, Y. N., Zaim, M., & Rozimela, Y. (2022). Interactive Learning Using E-Learning Module in Learning English for Senior High School: A Review of Related Articles. *JELITA*, 1(2), 125–134. <https://doi.org/10.37058/jelita.v1i2.5306>

González-Carrasco, I., García-Sánchez, J. N., García-Peñalvo, F. J., & Conde, M. Á. (2021). *Gamification in higher education: A systematic review of recent trends*. *Education and Information Technologies*, 26(5), 5165–5197. <https://doi.org/10.1186/s40561-023-00227-z>

Serrano, M. C. (2023). Gamification and the History of Art in Secondary Education: A Didactic Intervention. *Education Sciences*, 13(4), 389.

<https://doi.org/10.3390/educsci13040389>

Bencsik, A., Mezeiova, A., & Samu, B. O. (2021). Gamification in higher education (case study on a management subject). *International Journal of Learning, Teaching and Educational Research*, 20(5), 211–231.

<https://doi.org/10.26803/IJLTER.20.5.12>

Marticorena-Sánchez, R., López-Nozal, C., Ji, Y. P., Pardo-Aguilar, C., & Arnaiz-González, Á. (2022). UBUMonitor: An Open-Source Desktop Application for Visual E-Learning Analysis with Moodle. *Electronics* (Switzerland), 11(6). <https://doi.org/10.3390/electronics11060954>

Muhammad, R. N., Wulandari, L. S., Qomarrullah, I., & Sawir, M. (2022). Dynamics of E-Learning During the Pandemic at Higher Education Institutions in Papua. *Journal of Education Technology*, 6(2), 338–349. <https://doi.org/10.23887/jet.v6i2>

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

Tjahjamoorniasih, N., Putra, L. S. A., Kusumawardhani, E., Pramadita, S., & Gunawan, V. A. (2023). An Android e-Learning Application to Support Academic Learning: Design, Development, and Implementation of a Case Study. *International Journal of Electrical and Electronic Engineering and Telecommunications*, 12(5), 363–372.

<https://doi.org/10.18178/ijeetc.12.5.363-372>

Laoyan, S. (2025, February 20). What is Agile Methodology? (A Beginner's Guide) [2025] • Asana. *Asana*. <https://asana.com/resources/agile-methodology>

Harriet Wangui Ndirangu, Kelvin Omieno, & Raphael Angulu. (2022). Functionality of Web-Based E-Learning Systems in Kenyan Universities. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, 165–174.

<https://doi.org/10.32628/cseit22859>

Iskandar, A., Mansyur, Saleh Ahmar, A., Muliadi, & Rahman, A. (2023). Android-Based E-Learning Application Design in Schools. *Journal of Applied Science, Engineering, Technology, and Education*, 5(1), 1–7.

<https://doi.org/10.35877/454RI.asci1643>

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

United Nations. (2022). *Goal 4 | Ensure Inclusive and Equitable Quality Education and Promote Lifelong Learning Opportunities for All*. United Nations. <https://sdgs.un.org/goals/goal4>

United Nations. (2025). *Goal 9 | department of economic and social affairs*. United Nations; United Nations. <https://sdgs.un.org/goals/goal9>

United Nations. (2025). *Goal 10 | Reduce Inequality within and among Countries*. United Nations. <https://sdgs.un.org/goals/goal10>

Awamleh, W. (2024). The effectiveness of e-project-based learning in improving the academic achievement and motivation of special education female students. *Cogent Education*, 11(1). <https://doi.org/10.1080/2331186X.2024.2369968>

Banihashem, S. K., Farrokhnia, M., Badali, M., & Noroozi, O. (2022). The impacts of constructivist learning design and learning analytics on students' engagement and self-regulation. *Innovations in Education and Teaching International*, 59(4), 442–452. <https://doi.org/10.1080/14703297.2021.1890634>

Dritsas, E., & Trigka, M. (2025). Methodological and Technological Advancements in E-Learning. In *Information (Switzerland)* (Vol. 16, Issue

LYCEUM OF THE PHILIPPINES UNIVERSITY - CAVITE

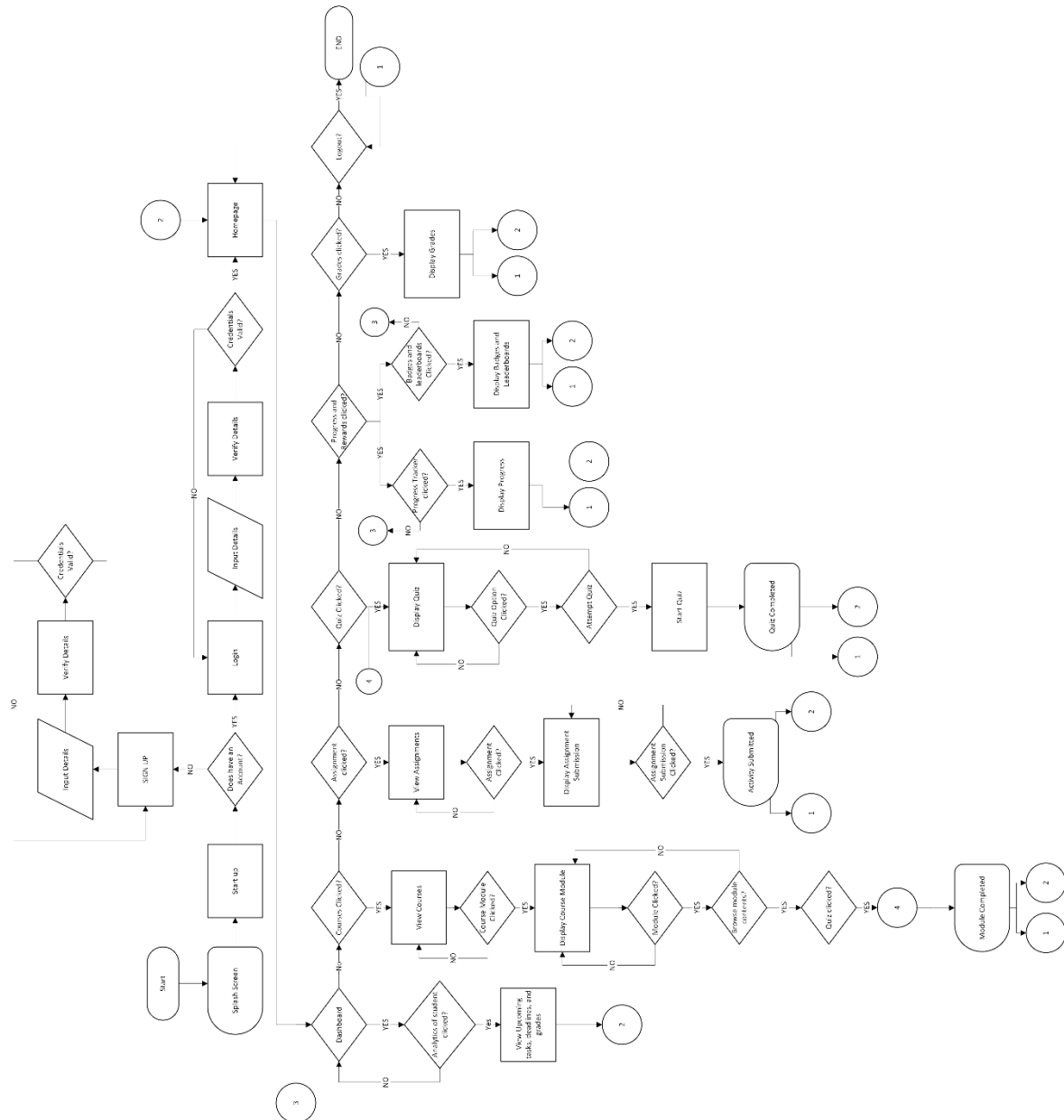
1). Multidisciplinary Digital Publishing Institute (MDPI).
--

<https://doi.org/10.3390/info16010056>

APPENDICES

Appendix A

Detailed Flowchart EduConnect Students



Appendix D

Gantt Chart

