

# **METACREATION: A PC Assembling and Disassembling Using VR for ICT Computer System Servicing NC II**

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Virtual reality (VR) is rapidly advancing mobile technology into a more sophisticated and immersive environment that parallels our natural world. VR is an immersive technology that creates a virtual environment where users can interact with objects and processes as they would in the real world. This capability allows for enhanced learning, simulation, and experimentation without the limitations of physical space or resources. Recently, the concept of the Metaverse has gained attention as a major trend in technological development (Tukur et al., 2024). The Metaverse, popularized by Facebook CEO Mark Zuckerberg, is described as the next evolution of social connection and the successor to the mobile internet (Kraus et al., 2022). Although the term gained mainstream attention only recently, it was first conceptualized in Neal Stephenson's 1992 novel *Snow Crash*, in which the protagonist navigates a virtual world called the Metaverse. Over time, this idea inspired the creation of online communities

and virtual platforms, such as Second Life, which allowed users to interact socially and functionally in virtual spaces (Dwivedi et al., 2022).

The Metaverse represents a collection of interconnected 3D virtual environments where users interact through avatars or digital representations. Platforms such as Rec Room, a virtual reality massively multiplayer online game, allow users to explore and create interactive experiences that blend real and virtual worlds. Rec Room is available on multiple platforms, including Microsoft Windows, Xbox, PlayStation, Meta Quest 2, and mobile devices. In these spaces, users can engage in activities ranging from parkour courses and virtual boxing to laser tag and dodgeball, offering both entertainment and educational potential.

This study focuses on the development of a VR-based system for PC assembly and disassembly aimed at ICT students. The system is designed to provide a safe, interactive, and cost-effective learning environment. By using VR, students can practice assembling and disassembling computer components without risking damage to school equipment or personal safety. The virtual environment allows learners to gain practical experience while reducing material costs and resource usage, making training more sustainable and accessible. Users interact with virtual objects that can be upgraded, reused, and manipulated repeatedly, enabling a hands-on learning process that closely mirrors real-world operations. To use the system, learners install Rec Room on PCs, laptops, or mobile devices if a VR headset is unavailable. Within the simulation, students can explore a virtual environment containing computer components and follow guided instructions for assembling and disassembling a PC. This approach not only reinforces theoretical knowledge but also develops practical skills through experiential learning.

The study acknowledges that developing VR-based learning

technologies requires significant time and effort. However, its benefits extend across multiple sectors, including education, business, transportation, and communication, providing innovative solutions for training, collaboration, and skill development. By integrating VR and Metaverse platforms into learning processes, the research aims to enhance student engagement, promote interactive learning, and prepare learners for real-world applications in ICT and other technology-driven fields.

Ultimately, this research demonstrates the potential of VR and Metaverse technologies to transform education by offering immersive, practical, and cost-effective learning experiences, particularly in contexts where physical resources are limited. The integration of PC assembly and disassembly simulations into a virtual environment represents an innovative step toward bridging theoretical knowledge with practical skills in a safe, interactive, and scalable manner.

## **Theoretical Framework**

### ***Virtual Reality in Education***

VR has emerged as a transformative tool in education, particularly during periods of restricted physical access, such as the social distancing measures implemented during the COVID-19 pandemic. According to Try et al. (2021), VR has been successfully integrated into civil engineering laboratory courses, allowing students to engage in complex experiments that would have been otherwise impossible due to limitations in equipment, accessibility, safety, and cost. By creating a virtual replica of a laboratory environment, students can experiment, make mistakes, and learn from them without risking physical damage to materials or harm to themselves.

Beyond simply providing a visual representation of concepts, VR

enables students to actively interact with virtual elements, promoting a deeper understanding of the subject matter. There are two main methods of utilizing VR in education: through conventional computer interfaces using keyboards and mice, or via immersive devices like helmet-mounted displays (HMDs) or VR controllers. While the former allows basic interaction, HMDs and similar devices provide a fully immersive experience, enabling learners to feel present in the virtual environment. This immersion is crucial in reinforcing experiential learning, as students are not merely observing a process; they are actively participating in it.

### ***Benefits of Virtual Reality for Learning***

The primary strength of VR in education lies in its ability to facilitate experiential learning. Unlike traditional learning methods, where students passively receive information, VR encourages active engagement by allowing learners to manipulate objects, perform tasks, and navigate complex systems (Strzałkowski et al., 2024). This type of learning is particularly beneficial in technical fields such as engineering, ICT, and health sciences, where practical skills are as important as theoretical knowledge.

Studies have shown that students using VR exhibit improved memory retention, stronger knowledge connections, and higher learning outcomes compared to conventional learning methods (Analyti et al., 2024; Parong & Mayer, 2018; Crogman et al., 2025; Kubr et al., 2024; Lin et al., 2024; Liu et al., 2025; Cinar et al., 2024). For instance, by simulating real-world tasks in a safe virtual space, students can explore consequences, test hypotheses, and troubleshoot errors without real-world repercussions. This not only enhances cognitive understanding but also builds students' confidence in applying knowledge to practical scenarios. Additionally,

VR's interactive nature encourages engagement, motivation, and curiosity, factors that are closely linked to effective learning.

### ***Related Systems and Applications***

Several VR applications illustrate its educational and training potential. For example, PC Creator: Building Simulator is a mobile application that allows users to assemble computers, install operating systems, upgrade components, and troubleshoot software. By simulating a real-world PC-building environment, the application provides an interactive learning experience that develops both technical and problem-solving skills. Users can experiment with different hardware configurations, encounter simulated errors, and learn strategies for resolving issues, all within a risk-free environment.

Similarly, Rec Room is a VR platform that combines social interaction with immersive gameplay. Available across multiple platforms, including PC, consoles, VR headsets, and mobile devices, Rec Room allows users to participate in collaborative activities such as parkour courses, virtual boxing, laser tag, and dodgeball. The platform also offers tools for users to design and customize virtual spaces, encouraging creativity, collaboration, and spatial problem-solving. These applications demonstrate how VR can move learning beyond theoretical instruction, integrating practical experience, creativity, and social interaction into educational contexts.

### ***VR and the Metaverse in Modern Learning***

The concept of the Metaverse represents the next frontier of immersive education. Often described as a fully interconnected, 3D virtual Internet, the Metaverse leverages VR and augmented reality (AR) to create

spaces where users can socialize, collaborate, and engage in interactive experiences. Within the Metaverse, learners are not constrained by physical classrooms; instead, they can explore multiple environments, participate in simulations, and interact with both peers and virtual objects in real time.

The Metaverse also enables new forms of experiential learning. For instance, students can enter a virtual laboratory or workshop, manipulate digital objects, and observe outcomes that mirror real-world physics and engineering principles. Through avatar-based interactions, learners can collaborate with peers, exchange ideas, and solve problems collectively, fostering social and cognitive development simultaneously. As VR platforms like Rec Room continue to expand into educational applications, the integration of the Metaverse allows for scalable, immersive, and collaborative learning experiences that extend beyond traditional classroom boundaries.

### ***Implications for Education and Skill Development***

The adoption of VR and Metaverse-based learning tools carries significant implications for education and professional training. For ICT students, a VR-based PC assembly and disassembly simulation provides hands-on experience with hardware components, troubleshooting, and system configuration in a safe, controlled environment. This reduces reliance on physical resources, minimizes the risk of property damage, and lowers training costs while maintaining the quality of skill development.

Beyond technical skills, VR encourages critical thinking, problem-solving, and adaptive learning. Students are required to make decisions, anticipate consequences, and develop strategies in virtual scenarios that closely mimic real-life challenges. The ability to repeat simulations, practice complex tasks, and receive immediate feedback enhances learning

outcomes and prepares students for real-world applications. Furthermore, as VR and Metaverse technologies continue to evolve, their integration into educational curricula offers opportunities for lifelong learning, cross-disciplinary collaboration, and global knowledge exchange.

## Research Framework

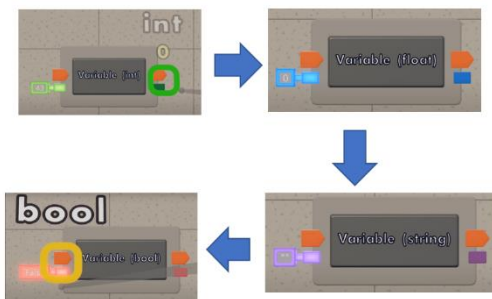
### *Data*

The data for this study were gathered from survey responses of 35 participants. Slovin's formula was used to determine the total number of respondents, and a random sampling method was employed to distribute the questionnaires. The questionnaire was based on ISO 2510 and included the following aspects: performance efficiency, maintainability, suitability, and usability.

A four-point Likert scale was applied, consisting of the following categories: strongly agree, agree, disagree, and strongly disagree. Each respondent was required to answer every item. The mean range for each scale was used to calculate the evaluation outcomes.

**Figure 1**

*Circuits System Mechanics*



As shown in Figure 1, the system does not need to collect any personal data, as it is primarily focused on the mechanics of building a PC.

In RECROOM, circuits serve as the type of data, with different input pin colors indicating their data types: blue input pins represent floats, green input pins represent integers, red input pins represent booleans, and purple input pins represent strings. However, a Gmail account is required to access the virtual environment or application, similar to other apps typically installed on devices.

### *Ethical Considerations*

Participants are expected to treat one another respectfully. Language, conduct, or content that is sexist, racist, discriminatory, or harassing is strictly prohibited. Participants must not encourage, support, or engage in criminal activities. Players under the age of 12 must use a junior account, and only one participant is allowed per account. The player's birthdate must match the account information.

Content that is disruptive or inappropriate in public spaces, such as pornographic material or contentious topics, is not allowed. Private or unlisted rooms are exempt from these rules, but all participants must consent to activities within these spaces. Spaces that could be potentially sensitive should clearly indicate their purpose to other users before entry. Participants should not impersonate developers, moderators, or authority figures, and should avoid interfering with other players' games. The proponents aim to minimize regulations governing conduct in every game. Prohibited behaviors include cheating, misusing in-game controls, poor sportsmanship, or general disruptive behavior. Code of Conduct violations should be reported using the in-game reporting features.

*Player-created rooms.* The behavior of a room reflects the actions of its owners and builders. Public custom rooms that violate the Code of Conduct will be treated as if all owners committed the infractions. Room

creators are responsible for ensuring their spaces do not become hazardous or disruptive. If room creators are unable to monitor their rooms regularly, such as when traveling, they should consider making them private or appointing reliable co-owners. All co-owners are accountable if they are able to maintain the room; otherwise, they are not. Room owners should remove themselves if they will be absent for an extended period or no longer wish to manage the room. The ultimate responsibility lies with the room creator.

*Clubs.* Owners and co-owners must actively manage their clubs to ensure adequate moderation and maintain a positive reputation. If additional time or support is required, owners should consider making the club private or appointing co-owners or moderators. Sexually themed clubs must remain private. Clubs cannot promote illegal activities. Clubs with repeated moderation issues may be closed or made private, and temporary or permanent bans may be imposed on the founder and other owners.



### ***Experimental Design***

In this study, the independent variable is the use of VR, while the dependent variable is its impact on the learning process.

Using a stand-alone VR application, Rec Room provides a compact and basic portable solution for creating virtual worlds within the platform itself. It allows users to design objects and implement desired functions without requiring complex coding. Instead, it utilizes a logical drag-and-drop system that is already prepared and modifiable. The application emphasizes logic-based functionality, with minimal coding needed, and does not require any additional software beyond the platform. It is similar to Horizon Worlds by Facebook Meta; however, it has not yet been released in the Philippines.

**Table 1**

*Dependent and independent variables*

<b>Experimental Group (With VR)</b>	<b>Control Group (No VR)</b>
Sample/Group A	Sample / Group B
	
Studying Using VR	Studying in a traditional way
Assessment The Proponents prepare a short lesson regarding solar system with a fix time duration, then let them take a short test with 10 items (identification).	Assessment The Proponents prepare a short lesson regarding solar system with a fix time duration, then let them take a short test with 10 items (identification).
<b>Test Score: 8</b>	<b>Test Score: 6</b>

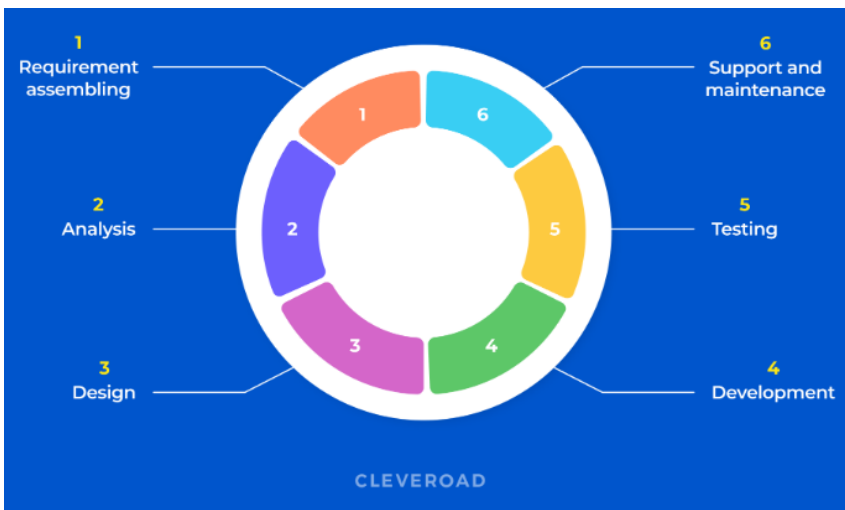
Participants using VR achieved higher scores compared to those not using VR. Follow-up interviews were conducted to understand how VR influenced their learning process. Participants who used VR reported that learning was much more enjoyable because the immersive environment enhanced engagement, provided excellent visualizations of subjects, and allowed them to focus more closely on the material. In contrast, participants who did not use VR stated that conventional study methods were routine and offered little variation, often requiring them to contend with distractions from their surroundings. Therefore, the proponents conclude that VR can effectively support learning due to its immersive environment. It allows learners to experience actual demonstrations of objects and concepts, which are more likely to be retained in memory.

### *Procedures of the Different Phases*

The SDLC is often referred to as a framework for planning, developing, testing, managing, and delivering reliable technical services. It simplifies the process of identifying the current phase in which developers are working, determining the resources required, and outlining the subsequent steps needed to complete the project.

**Figure 2**

*Agile model development phases*



Before starting development, the team studies the business, including its functions, requirements, and challenges related to assembling and disassembling components of interest to researchers. Developers then assist in defining the requirements, organizing development sprints, and determining the type of solution that will best meet those needs. Understanding business requirements prior to development is essential, but the Agile methodology allows for adaptability, enabling changes to be made as they arise. This approach ensures the effectiveness of the carefully designed software solution. Planning conducted before development

enhances project success and prepares the team for upcoming development sprints.

*Analysis.* The first stage of the project involves gathering requirements and performing an analysis. During this phase, all subsequent activities related to product development are outlined. This stage is dedicated to resolving uncertainties regarding planning, design flow, and software specifications.

*Design.* The design phase follows analysis and includes the conceptualization of the product's panels, buttons, and other user interface components. Additionally, it affects how smoothly the software's business logic operates.

*Development.* The third stage of the SDLC is development, also referred to as functionality implementation or scripting. During this phase, the designed software elements are implemented, and the source code is written.

*Testing.* This phase involves verifying the product to identify and fix bugs or errors in the code. The solution undergoes thorough testing, often in multiple cycles, to eliminate all issues and ensure proper functionality.

*Deployment.* Deployment is the process of launching the software and distributing the product to end users.

*Maintenance.* The maintenance phase ensures that the solution remains relevant and continues to meet evolving market demands. Additionally, if a user encounters an issue, it can be addressed through hot-fixes or scheduled updates to maintain optimal performance.

## **Technical Framework**

### ***Materials***

The primary technology material required for this system is a VR headset, specifically the Meta Quest 2 (formerly Oculus Quest 2). VR is an immersive technology that creates a virtual environment in which users can interact similarly to the real world. With the recent emergence of the metaverse as a major technological trend, VR platforms have become increasingly significant for research and development.

The platform used is Rec Room, a VR gaming platform that allows users to navigate different worlds, participate in games, hangouts, or relevant applications, and even develop their own applications as “Creators.” The proponents selected this platform based on prior experience and confidence that it can effectively support the system, although further research is required.

### ***Software***

Rec Room is the primary software platform used in this study. It is a standalone VR platform that is freely accessible to users. Rec Room allows users to create virtual worlds, build gaming simulations, and engage in games, hangouts, or other applications. Users who create content within the platform are referred to as “World Creators.” Rec Room is a VR massively multiplayer online game with an integrated game creation system, developed and released by Rec Room Inc.

Rec Room is compatible with Microsoft Windows, Xbox One, Xbox Series X and Series S, PlayStation 4, PlayStation 5, Meta Quest 2, as well as iOS/iPadOS and Android devices via the App Store.

## Hardware

The hardware required for this system includes a VR headset, laptop/PC, or mobile device.

*Virtual Reality Headset (VR Headset).* The VR headset used is the Meta Quest 2 (formerly Oculus Quest 2). VR headsets are head-worn devices that provide an immersive 3D experience by covering the eyes and displaying a virtual environment in which users can interact as they would in the real world. VR headsets may be self-contained, such as the Meta Quest, or connected to a powerful computer, such as the HTC Vive, to handle complex animations. These devices are critical for providing users with a fully immersive experience and are central to exploring current trends in the metaverse.

**Table 2**

*Hardware specification*

<b>1. VR Headset</b>	<b>VR Meta Quest 2</b> (specs: RAM: 6GB; ROM: 256GB Chipset: Qualcomm Snapdragon XR2)
<b>2. PC Laptop</b>	<b>Operating System:</b> Window 10 or Higher <b>Processor:</b> Intel i7 or Ryzen 5 3600 <b>Memory:</b> 16GB RAM <b>GPU:</b> GTX 980 or RTX series
<b>3. Mobile Phone</b>	<b>Operating System:</b> IOS / Android 11 <b>Processor:</b> Snapdragon series / Helio Series <b>Memory:</b> 6GB RAM

Table 2 shows the system requirements to ensure compatibility across different devices. This is due to the Rec Room VR platform, which is used for developing the PC Building Simulator. Rec Room is a cross-platform VR environment that hosts the project within it. Because it

provides an immersive virtual environment, the system demands substantial graphics rendering, high refresh rate performance, and a strong, stable internet connection. Therefore, the system requires at least mid-range devices to operate at its full potential.

The authors first determined the required functions based on actual PC building operations. They then analyzed and identified a suitable VR platform capable of representing the entire system, including both design and functionality, which was found to be REC ROOM. The analysis also considered the necessary hardware, identifying the VR headset as the primary device for developing and operating the system.

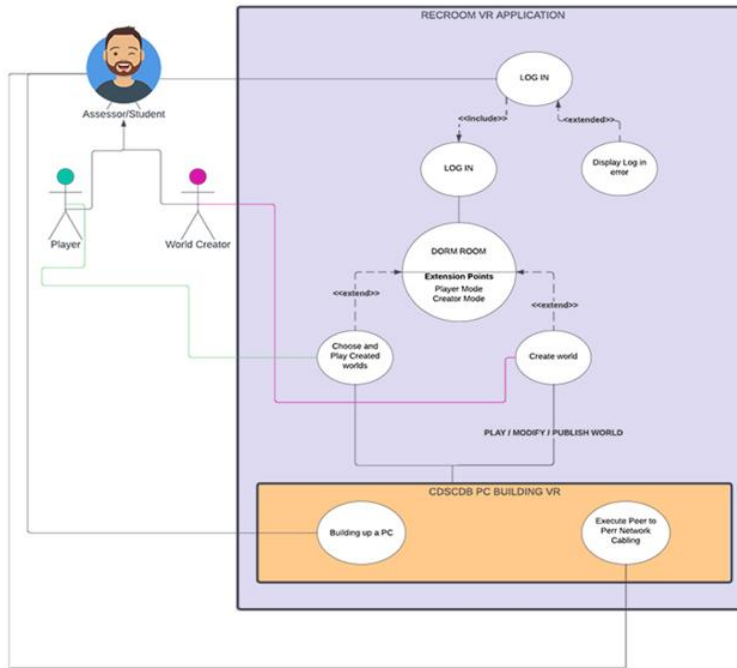
### ***System Design***

System Design is the process of defining the architecture, components, modules, interfaces, and data that satisfy specific requirements of a system. It serves as the blueprint for building and integrating the hardware, software, and processes that work together to achieve the system's objectives. By providing a structured framework, system design minimizes errors, guides implementation, and supports long-term adaptability of the system.

The UML Use Case diagram (Figure 3) provides a visual representation of the overall interaction between users and the system through the Rec Room VR application. It outlines the sequence of actions that a user can perform, beginning with system access via devices such as a PC or VR headset. Through the Rec Room VR platform, users are able to navigate and explore a variety of virtual environments that have been created and shared by other users, highlighting the collaborative and user-generated nature of the platform.

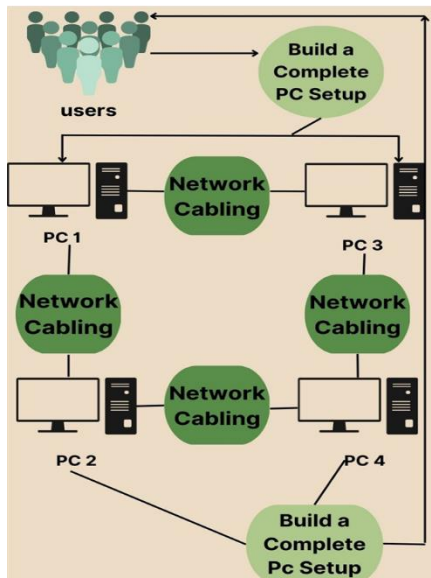
**Figure 3**

*Use case diagram*



**Figure 4**

*System Design*

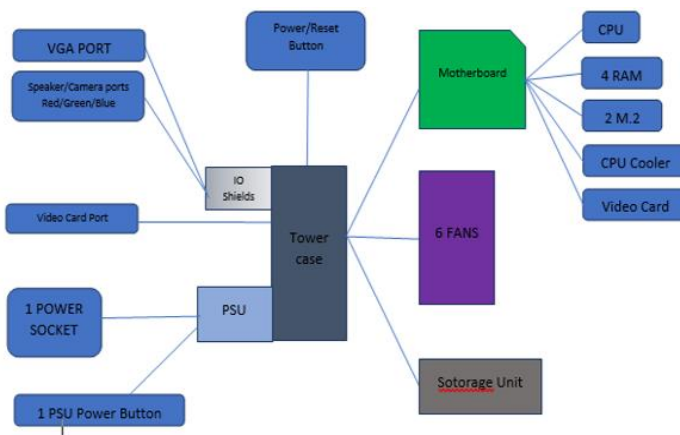


As shown in Figure 4, users can understand complex systems by using system diagrams. These diagrams serve as tools to aid in comprehending how various components of a system interact. Changes in one component can affect other factors, making these diagrams particularly useful. They are also an effective tool for analyzing the potential long-term impact of virtual reality on society.

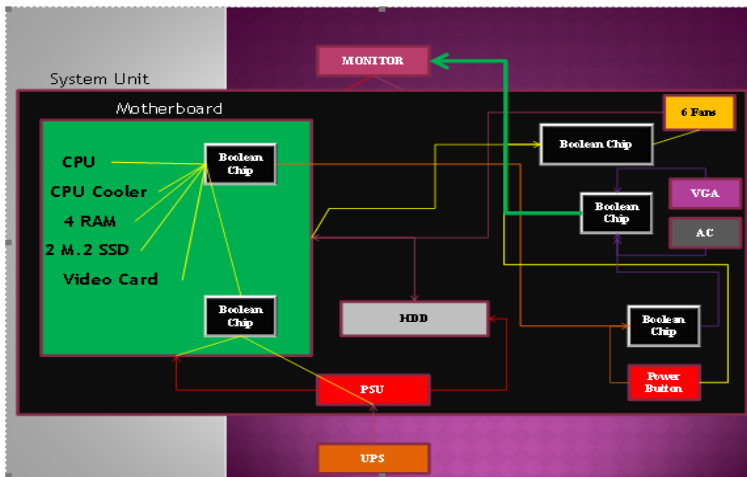
Figure 5 shows the electrical, direction and connection of the system. The building sequence of a computer begins with setting up the Power Supply Unit (PSU), which provides the necessary power for all components. Next, the motherboard is prepared by installing essential parts such as the CPU, CPU cooler, RAM, M.2 SSD, and video card. Once these components are securely in place, the motherboard itself is installed into the case, followed by the installation of additional storage devices such as the HDD. After all hardware is mounted, the necessary cables are connected to ensure proper power delivery and data transfer between components. Finally, the system is powered on by turning on the switch, completing the assembly process.

**Figure 5**

*Electrical, direction and connection*



**Figure 6**  
*System logic*



As shown in Figure 6, the chips or circuits containing the program module are responsible for detecting the objects required to trigger the next event in a sequence, depending on the wiring connections. For example, the monitor requires a VGA cable, a power cable (AC), and an electrical supply provided through the power cable connection to the PSU. These components must first meet the required conditions before the monitor can become active and the computer can be powered on.

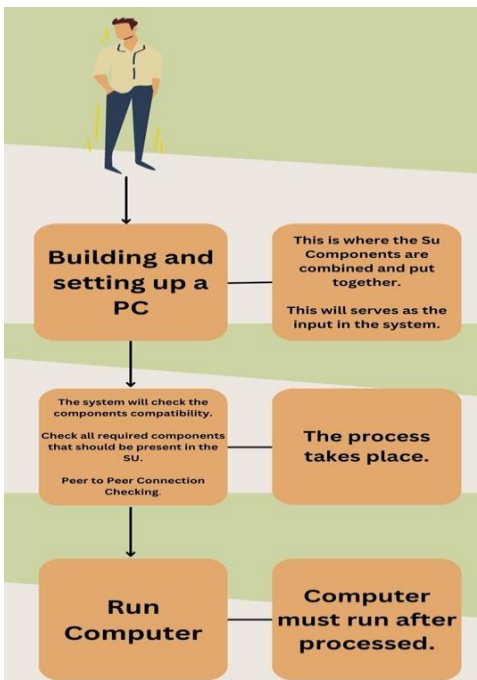
### ***Data Flow Diagram***

This system is specifically designed to simulate the process of building and setting up a PC, with a key focus on ensuring that all components are compatible with one another. It serves as the primary input mechanism for the system, allowing users to interact directly with the interface and engage with the simulation's mechanics. The system emphasizes user interface design, providing intuitive controls and feedback to guide users through each step of the PC assembly process. Internally, the

system uses circuit-based logic to manage the interactions between components, ensuring that actions occur in a sequential and realistic pattern. By combining interactive mechanics with component validation, the system not only enhances user engagement but also provides an educational experience in understanding hardware assembly and compatibility.

**Figure 7**

*Data flow diagram*

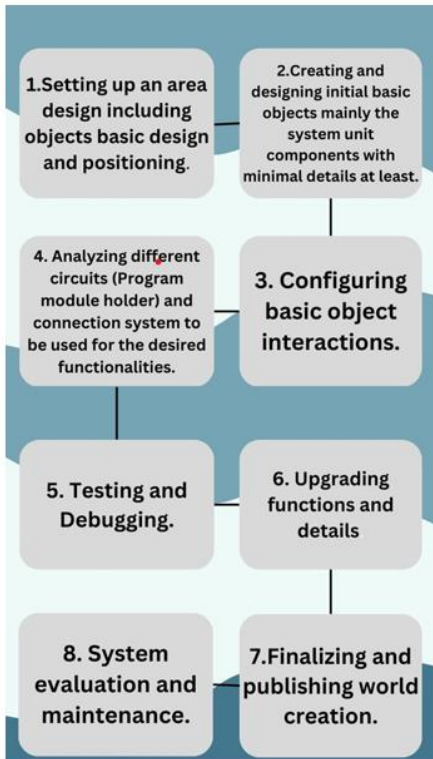


As shown in Figure 8, in the development stage of the system, the first step is designing the area, followed by creating and designing the initial basic objects. Next, fundamental object interactions are configured, and different circuits and connection systems are analyzed. This is followed by testing, debugging, and upgrading functions and details. Finally, the world creation is finalized and published, after which system evaluation and

maintenance are conducted.

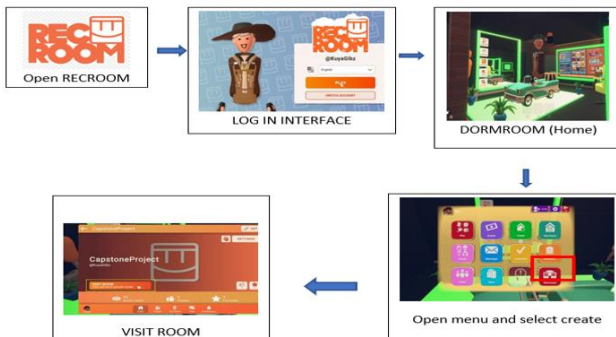
**Figure 8**

*Steps of the system development*



**Figure 9**

*Opening the world*

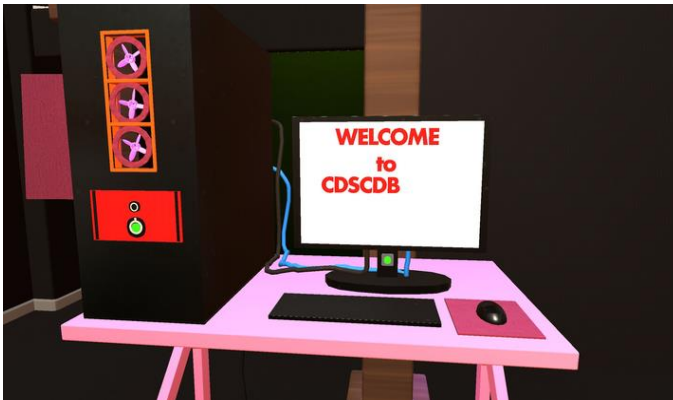


After completing the stages, the player will reach the virtual world,

where other players can be invited to explore it. Once the world has been published in the game, anyone can freely enter and experience it.

**Figure 10**

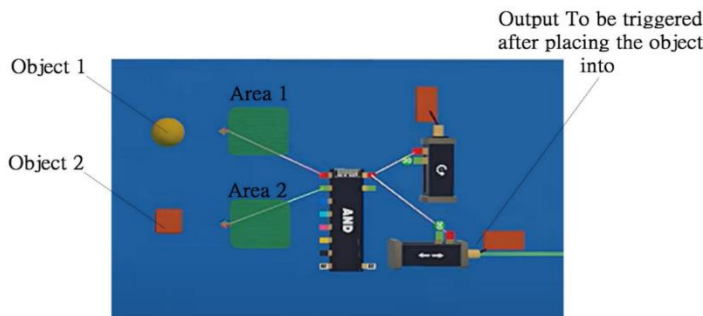
*VR interface*



Players can enter the world created by the proponents within Rec Room VR. This is what the world looks like once inside; it was initially created by the proponents and may be modified in the future. It also provides a summary of the testing facility, where several experiments were conducted for various purposes that can be applied to the project and future updates.

**Figure 11**

*System testing demo*

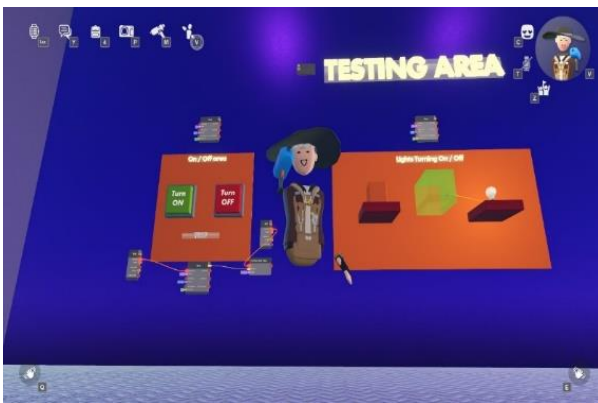


The objects represent the system unit components that are inserted into their designated sockets. The area serves as the system's socket, where each component is placed. This trigger zone determines whether a component has been inserted correctly and verifies that all required components are present before the system can operate as intended. The image demonstrates only a portion and specific function, but there is much more to explore within the system.

### *Testing Case*

**Figure 12**

*Testing area of the system*



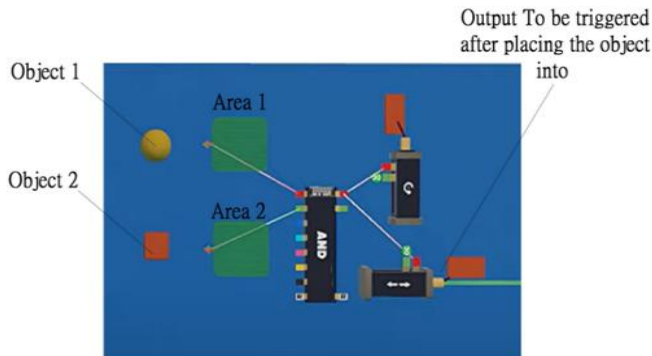
The scope and objective of the testing process are to ensure that the system operates in a manner closely aligned with real-world procedures for building a PC, including all basic networking processes. Various testing setups are employed to verify that the desired functionalities are achieved. The specific functions to be tested are outlined below.

As shown in Figure 13, the system interface for the Object Trigger Zone Detection System is designed to detect and verify whether an object is correctly attached to its designated area or part within the PC tower case.

The system also identifies and ensures that all required components to operate the computer are properly attached and placed. Additionally, it manages interactions between objects and the virtual environment.

**Figure 13**

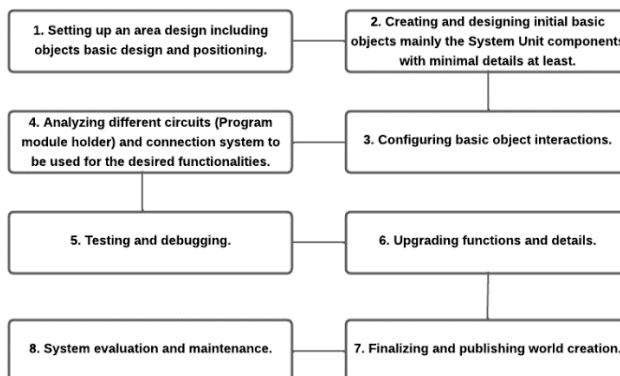
*Testing setup*



The researchers employed a proactive testing approach, commonly used in system development. This technique was chosen because it allows errors and bugs to be identified at early stages of development. Programmers begin the test design process as soon as possible to detect and fix faults before the system build is completed.

**Figure 14**

*Development of maintenance*



Setting up the area design is the first step in system development. The subsequent steps include creating and designing the initial basic objects, configuring fundamental object interactions, analyzing various circuits and connection systems, testing, debugging, upgrading functions and details, and finally finalizing and publishing the world creation, followed by system evaluation and maintenance.

### ***System Evaluation***

One of the fundamental challenges faced by ICT students in PC assembling and disassembling is encountering non-functional or damaged system units at the beginning of their learning process. To address this, studies have been conducted to develop a system that assists students in assembling and disassembling a system unit more effectively, efficiently, and in an organized manner. This system leverages VR technology, focusing on performance efficiency, maintainability, suitability, and usability.

**Table 3**

*Operational cost analysis*

<b>Operational Cost</b>	<b>Quantity Unit</b>	<b>No. of Months</b>	<b>Cost</b>	<b>Total</b>
Electricity (Computer and Printer)	2	7	Php 500.00	Php 3,500.00
Internet Fee	1	7	Php 400.00	Php 2,800.00
Maintenance Fee	1	3	Php 1300.00	Php 3,900.00
VR Headset (MetaQuest2)	1	7	Php 27,000.00	Php 27,000.00
<b>Subtotal</b>				<b>Php 37,200.00</b>

Operational cost-benefit analysis estimates and sums the monetary value of the system's benefits and costs to determine whether it is

productive and worth the investment. The system's operational costs are presented above, including the cost duration, monthly expenses, and the overall cost of using the system.

**Table 4**

*Development cost analysis*

<b>Development Cost</b>	<b>Quantity Unit</b>	<b>No. of Months</b>	<b>Cost</b>	<b>Total</b>
Developers	1	1	Php 19,999.00	Php 19,999.00
System Analyst	1	1	Php 30,999.00	Php 30, 999.00
Internet Fee	1	7	Php 1,300.00	Php 9,100.00
Researcher	2	10	Php 25,000.00	Php 50,000.00
<b>Subtotal</b>				<b>Php 110,098.00</b>

Table 4 is the estimated cost-benefit analysis to consider whether the system benefits investment.

The system was evaluated by 35 respondents using a questionnaire based on ISO 2510, covering the following aspects: performance efficiency, maintainability, suitability, and usability.

**Table 5**

*Weighted average distribution of the criteria developed system*

<b>Criteria</b>	<b>Weighted Mean</b>	<b>Remarks</b>
Performance Efficiency	3.37	Strongly Agree
Maintainability	3.36	Strongly Agree
Suitability	3.19	Agree
Usability	3.31	Strongly Agree
<b>Average</b>	<b>3.30</b>	<b>Strongly Agree</b>

Table 5 shows that the overall system evaluation survey yielded an average weighted mean of 3.30, indicating that respondents rated the system

as outstanding in terms of performance efficiency, maintainability, suitability, and usability. This suggests that the system is capable of performing the specified requirements effectively.

*Performance efficiency.* The system is easy to understand. The average weighted mean for performance efficiency is 3.37, with a remark of Strongly Agree. This indicates that respondents are satisfied with the system's performance and its functionality.

*Maintainability.* The system is easy to maintain and incurs low costs. The average weighted mean for maintainability is 3.36, with a remark of Strongly Agree.

*Functional suitability.* The system functions effectively in terms of functional suitability. Respondents agreed that the developed system could serve as a future tool in their community because it works well and appears practical for use. The average weighted mean for functional suitability is 3.19, with a remark of Agree.

*Usability.* The system is easy to use. Respondents, including those unfamiliar with Virtual Reality (VR), reported that they quickly learned the system's controls within minutes. The average weighted mean for usability is 3.31, with a remark of Strongly Agree.

Based on the general evaluation, the results indicate that the VR system created by the proponents using Rec Room has the potential to teach PC building even to beginners and those new to the course. Although the system is still in the prototype stage, it already covers the basics, including assembling and disassembling the entire computer setup.

*Economic feasibility.* To evaluate the system, a cost-benefit analysis was conducted to determine whether the anticipated benefits would equal or exceed the system's projected costs. The system's advantages and limitations provide feedback regarding its costs and benefits, offering an

accurate comparison. Additionally, the ISO 2510 questionnaire-based assessment provided feedback on the system's economic feasibility and overall functionality.

*Technological feasibility.* If the project is successfully completed, it can offer several technological advantages. The system is user-friendly for beginners, and the construction of materials is simple, with components easily removed and replaced using red and blue screws. Further improvements can enhance the system's efficiency, profitability, and distinctiveness.

*Operational feasibility.* The system is operationally viable because it was designed with user-friendliness in mind. Survey results indicate that ICT students were satisfied with the system, finding it easy to use after a brief demonstration with a VR headset.

## **Conclusion**

The VR system developed using Rec Room demonstrates significant potential in teaching PC building, even for beginners or students new to the subject. Although still in the prototype stage, the system effectively covers fundamental tasks such as assembling and disassembling computer components, allowing students to practice without the risk of damaging actual parts. This approach also reduces unnecessary expenses on hardware replacement and provides a more engaging and enjoyable learning experience through a 3D immersive VR environment compared to traditional methods. Furthermore, the system met the ISO/IEC 2510 criteria for performance efficiency, maintainability, suitability, and usability, indicating that it is functional, user-friendly, and operationally feasible. Overall, the study demonstrates that VR technology can serve as an

effective and practical alternative to conventional PC assembly and disassembly techniques, offering both educational value and operational efficiency.

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