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# Development of Golf World Game Using Roblox Platform

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**Abstract**

The Golf World Game is a unique educational game created using Roblox platform. The purpose of this game is to combine and aim to blend entertainment with learning in one game. However, most golf games nowadays are lack of educational content. These games does not teach players the fundamental ideas and skills related to the game of golf. Instead, they focus mostly on entertaining and interactive gameplay. To tackle this issue, Multimedia Mobile Content Development (MMCD) is used to develop the project. This Golf World Game was developed in the Roblox Studio platform, and this project is designed for UTHM students, especially those interested in learning about golf. The The game was tested with multiple users, and the results showed that it successfully delivered an engaging and educational experience. Players reported high levels of enjoyment during gameplay, particularly appreciating the smooth mechanics and interactive features such as the quiz module and infographics.

## 1. Introduction

Millions of people participate in the popular sport of golf, which offers a special combination of patience, strategy, and physical accuracy. During the years of the 15th and 16th centuries, golf changed from being an unorganized game to an organized sport [1]. Golf is an outdoor sport where players need to aim and hit a small ball into a few holes on a field in as few strokes as possible. The different environments on each hole have obstacles such as fairways, sand bunkers, and water hazards that provide different challenges. Each hole's objective is to be finished within or under the “par”, which is the number of shots a skilled golfer should expect to need. For newcomers who want to understand and learn more about golf, online games on gaming platforms are a great option to explore. Online gaming platforms such as Roblox allow people to experience the excitement of golf in a virtual environment by simulating real-world games. Roblox offers realistic interactive worlds that may make learning and improve student engagement [2]. By closing the gap between interactive digital learning environments and traditional learning methods, these games can improve knowledge of the subject matter and motivate players [3]. In addition, it will give the relationships between playing golf and wellbeing, social trust, and physical activity [4].

In this era, most golf games currently being played on many platforms including Roblox lack educational content. These games do not teach players the fundamental ideas and skills related to the game of golf. Instead, they concentrate mostly on entertaining and captivating gameplay. Without integrating educational elements into the gameplay, players who want to understand the rules, techniques, or history of golf must rely on external sources, such as video tutorials, books, or in-person lessons. If this issue is not resolved, the difference between golf games on Roblox that are meant to be entertaining and educational will keep growing, preventing the platform from becoming a thorough educational resource.

However, this project aims to design a user-friendly Golf World Game using Roblox platform that is visually appealing and easy for users to play, to develop an interactive module in Golf World Game that provides

convenience to users and knowledge about golf and to evaluate the usability test for Golf World Game through feedback and testing. The proposed application is designed for UTHM students especially those interested in learning about golf while enjoying a gaming experience. The subject matter expert (SME) participating in this project is Dr. Nasarudin, who handles the golf club in UTHM.

The Golf World Game consists of 3 modules which are game, quiz, and infographics modules. For Golf Game module has a 9-hole golf range, each hole carefully crafted to present a unique set of obstacles and challenges. The Quiz Game module in Roblox's Golf World Game has 15 questions and designed to be an entertaining and informative tool for players to improve their golf skills. The infographic module functions as a virtual educational area where beginners may get a deeper understanding of the golf sport. By using the MMCD methodology, a systematic and structured process is followed throughout the development process.

The rest of the paper is arranged as follows:the domain of study, the technology used, and the result of the comparative analysis are all covered in Section 2. The MMCD methodology selected for this project is described in Section 3, along with the results of the analysis and design phases. Additionally, the result and discussion are covered in Section 4, and the conclusion of the current progress is stated in Section 5.

## 2. Related Work

This section discusses the background of the study, the technology used, and the result of the comparative analysis.

### 2.1 Golf Sport

Millions of people participate in the popular sport of golf, which offers a special combination of patience, strategy, and physical accuracy. During the years of the 15th and 16th centuries, golf changed from being an unorganized game to an organized sport [1]. Golf is a game where you play outside to aim and hit balls into a few holes on a field with as less number of shots as possible. The different environments on each hole have certain obstacles such as fairways, sand bunkers, and water hazards that provide different challenges. At University Tun Hussein Onn Malaysia (UTHM), golf education currently relies on traditional methods which are through classes and in-person coaching, where students learn basic skills, the rules of the game, and proper behavior on the course. However, the current methods have limitations, especially for beginners who need extra time and practice to build up their skills in golf sport. This is where the game-based learning method can be applied and play a significant role in improving the learning experience. The development of a player-friendly golf league management application addresses the complexities of organizing golf leagues by integrating automated features [6]. By implementing game-based learning in golf at UTHM, the students can learn the basic concepts, practice their skills, and even get feedback on them. Students can learn virtually and explore more about golf such as swing mechanics, rules, and history so that students can practice before getting out to the physical facility. This method improves students' understanding of golf mechanics because technology in education is not only limited to technology devices but also exploring other opportunities that will increase students' motivation and bridge the gap in educating this generation [7]. Lastly, this method is used to close the gap between theory and practice by improving students' knowledge and ability about golf courses through virtuality.

### 2.2 Game Based Learning

Game-based learning is a teaching method that is used in games to help people learn in a fun and attractive way. Game-based learning is based on the idea that play is an intrinsic motivator, and games provide a safe environment for learners to experiment, make mistakes, and learn from them. The enjoyment and competition inherent in games make learning more engaging and enjoyable [8]. Instead of traditional teaching methods like lectures or using a textbook, game-based learning improves traditional learning methods into an interactive experience where students can experience solving problems, completing challenges, or achieving goals. Game-based learning is effective because it depends on how games naturally motivate players by providing objectives, rewards, and chances to improve their skills and knowledge through practice [8]. It has been used in many industries, for example in schools, workplaces, healthcare and the military. In schools, apps like Kahoot! and Quizizz make classroom quiz more exciting by adding timers and points. In workplaces, businesses use games to train employees in skills like customer service or marketing. In healthcare, games like Pulse! train doctors and nurses in medical procedures. In the military, simulation games prepare soldiers for real-world situations.

### 2.3 Comparative Analysis

The comparative analysis focuses on three different golf games Golf Clash, Ultimate Golf, and Super Golf! as illustrated in Figure 1. Each game offers unique gameplay mechanics and user experiences, which serve as

valuable references for the development of the Golf World Game. Golf Clash Figure 1a is a mobile-based golf game that features a turn-based system, intuitive shot control, and a power bar mechanic. It is known for its smooth gameplay and competitive multiplayer mode. Ultimate Golf Figure 1b, also a mobile game, provides a more realistic golfing experience with enhanced 3D environments and physics-based swing mechanics, aiming for a simulation-style approach. In contrast, Super Golf! Figure 1c, a game developed on the Roblox platform, focuses on a more casual and arcade-style gameplay. It features colorful environments, simplified ball control, and imaginative course designs, making it highly engaging and accessible for younger audiences.


**(a)** **(b)** **(c)**

**Fig. 1** *(a) Golf Clash; (b) Ultimate Golf; (c) Super Golf!*

**Table 1** Application Comparison

| Features | Golf Clash | Ultimate Golf | Super Golf! | Golf World Game |
|---|---|---|---|---|
| Gameplay Style | • Swipe to aim, drag for power, with a simple shot timing mechanic. | • Swipe to aim and set power, with a "Perfect Shot" mechanic for precision. | • Drag and release for simple, intuitive controls. | • Drag and release for shooting, additional controls for interactive quizzes and infographic |
| Module Activities | • 1-on-1 matches,tournaments, club upgrades, skill-based challenges. | • Multiplayer tournaments, Blitz mode, Royale mode, club and ball upgrades. | • Multiplayer mini golf, whimsical course navigation, themed challenges. | • Golf gameplay, interactive quizzes, infographi cs about golf, |
| Multimedia Elements | • High-quality 3D visuals with a cartoonish style, audio for shots and background music. | • High-quality 3D visuals with a cartoonish style, audio for shots and background music. | • Bright, cartoonish 3D models with whimsical environments and light music. | • 3D golf courses, quiz images and infographic s, educational content, interactive elements with audio. |

**Table 1:** Application Comparison (continued)

| Features | Golf Clash | Ultimate Golf | Super Golf! | Golf World Game |
|---|---|---|---|---|
| Significant | • Competitive real-time play, weekly leagues, club customization. | • Realistic physics, real-life courses, challenging multiplayer formats. | • Fun and casual design, easy multiplayer setup, themed courses. | • Educational approach with golf trivia, a mix of golf gameplay, and interactive learning modules. |
| Difficulty | • Moderate; requires skillful timing and wind adjustments. | • Moderate to high; physics-heavy with an emphasis on real-world mechanics. | • Low to moderate; obstacle-driven with a focus on casual fun. | • Varies: Easy for golf gameplay (obstacle),<br>• moderate for quiz-based activities |

## 3. Methodology/Framework

The Golf World Game project utilized the Multimedia Mobile Content Development (MMCD) methodology, a structured approach for developing educational multimedia applications as in Fig 2. To improve user engagement and learning results, MMCD combines a variety of multimedia components, including text, graphics, animations, and interactive features. To efficiently produce the expected results, the process was divided into 5 phases. The five phases are the application of the idea creation stage, analyzing the structure stage, design the process stage, developing main functions and testing stage. Table 7 in Appendix A provides a summary of the output of the five phases of the MMCD methodology.

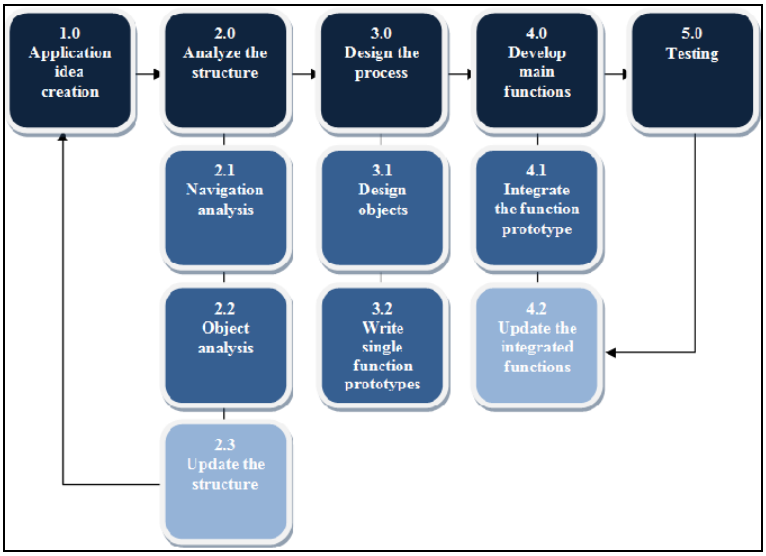


**Fig. 2** *MMCD Methodology [10]*

### 3.1 Application Idea Creation Stage

The first phase in developing the Golf World Game focuses on creating the application idea by identifying key elements and goals. This phase outlines the game's purpose: to combine quizzes and infographics for an educational and enjoyable experience, targeting beginner UTHM students. Key features include a quiz section for testing knowledge and an infographic display to educate players on golf rules, history, and equipment. The use of multimedia elements such graphics, animations, audio, and videos is planned to create an interactive experience. Development resources, tools, and timelines are also determined to ensure the project stays on track. This phase sets a clear direction, aligning the game with user expectations and educational objectives. To determine the first needs, it is therefore important to get feedback from subject matter experts (SME) and possible users. The application will continue to fulfill the requirements and expectations of its target audience due to this

cooperative approach. An interview session has been conducted with SME Dr. Nasarudin Bin Ismail, who handles Golf Club at UTHM and has experience participating in competition of golf sports. Therefore, a checklist for generating ideas has been created, as shown in Table 2. Meanwhile, Table 3 shows the user analysis. The interview was transcribed, and questionnaire questions can be found in Appendix B.

**Table 2** *Checklist Generating Ideas*

| Item | Explanation |
|---|---|
| Type of Application | Game-Based Learning. |
| Target Users | UTHM student. |
| Target Device | PC/Desktop. |
| Graphical User Interface (GUI) | Main world, Game module, learning module, quiz module. |
| Image | Golf-theme background. animated characters performing golf actions like swinging or putting. |
| Audio | Background music, sound effects. |
| 3D animation | Illustrates golf swings, ball trajectories, and interactions with course elements, animated action when the player chooses the wrong answer on quiz module |

**Table 3** *User Analysis*

| Subject Matter Expert (SME) Category | Role in the Product | Design Implications | Action Requirements |
|---|---|---|---|
| Subject Matter Expert (Dr. Nasarudin Bin Ismail) | Consultant expert in Golf tournament | Simple User Interface Design | • Use text-based buttons that are easier for the user to understand.<br>• Use a simple design to represent the background of the game |
| | | Reliable Content | • Design game modules (simple golf game, quiz, and infographics) based on reliable and accurate golf rules, with engaging and educational content. |
| | | Multimedia Content | • Use multimedia elements creatively to explain golfing techniques, strategies, and trivia. |

## 3.2 Structure Analysis Stage

The Structure Analysis Phase is important for refining the functionality and usability of the Golf World Game project. This phase focuses on breaking down the navigation flow to ensure that users can easily move

between different sections of the game, such as gameplay, quizzes, and educational infographics. Table 4 and Table 5 show the Functional and non-functional requirements of the proposed application. The system flowchart, navigation structure, and content structure of each module flowchart application module are shown in Appendix C to Appendix H.

**Table 4** *Functional Requirement*

| Functional Requirement | Module | Description |
|---|---|---|
| User Interaction | Main World | • The system shall provide users with the ability to explore and select the module. |
| | Game Module | • The system shall provide users with visual feedback, such as power level and shot direction, during gameplay.<br>• The system shall display scoring based on the number of shots taken to sink the ball. |
| | Quiz Module | • The system shall provide users with the ability to answer quiz questions about golf rules, techniques, and trivia.<br>• The system shall display the time for users.<br>• The system shall provide users with the ability to retry the quiz.<br>• The system shall provide users with the ability to back to the previous world. |
| | Infographic Module | • The system shall provide users with visuals that explain golfing techniques, such as club selection or swing mechanics.<br>• The system shall provide users with the ability to navigate back to the main world. |
| Autonomous System Activities | Quiz Module | • The system shall bounce back user to the spawn location if the user chooses the wrong answer.<br>• The system shall display “time out” if the users can’t answer the quiz within the time given. |
| | Game Module | • The system shall automatically calculate and display the score after completing a level.<br>• The system shall trigger sound effects when the player shoots the ball |
| | Infographic Module | • The system automatically plays the animation when the user views certain educational content |

***Table 5*** *Non-Functional Requirement*

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| Non-functional Requirements | Description |
|---|---|
| Performance | • Any interactions between the user and the system should not exceed two seconds. |
| Operational | • The application shall be able to operate on any PC/desktop. |
| Cultural | • The application shall be developed in English. |
| Legal | • Users cannot modify any information displayed in the game. |
| Usability | • The game shall be user-friendly and easy to navigate for beginners' players |

## 3.3 Process Design Stage

The Process Design Stage is where the visual and functional aspects of the Golf World Game were carefully crafted to ensure a seamless user experience. In this stage, the gameplay interface, the quiz and infographic section, and 3D models also were created. The design focused on ensuring that the game was intuitive and easy to navigate, providing players of all skill levels could engage with the game without confusion. Visual appeal was also a key consideration, to create an engaging environment that reflects the excitement of golf through attractive graphics and a user-friendly interface. Table 6 shows the 3D model design.

**Table *6*** *3D Model Design*

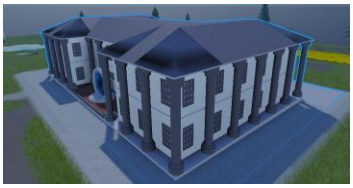
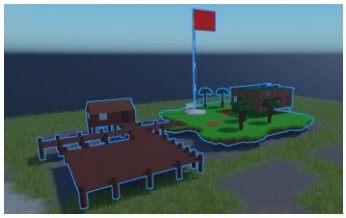
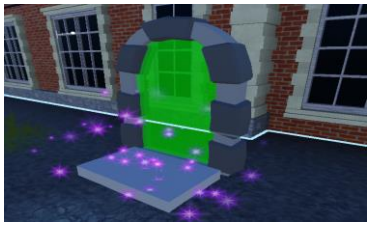
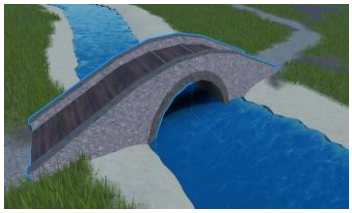
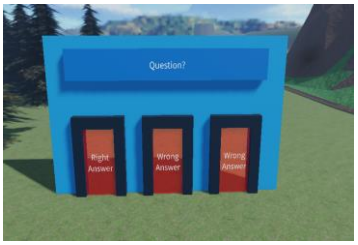
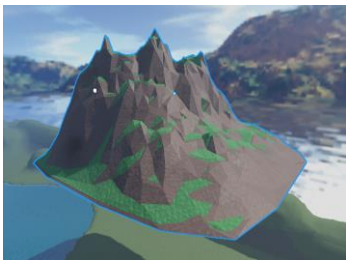
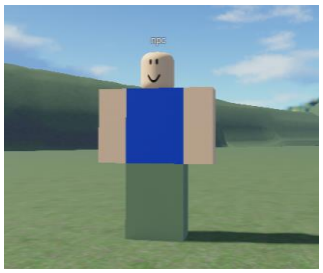
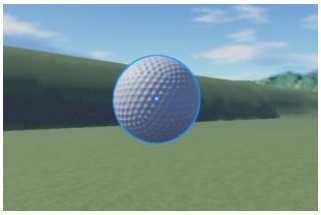
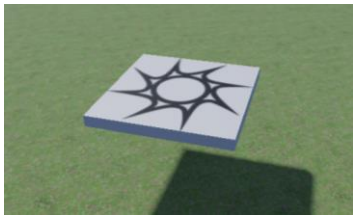
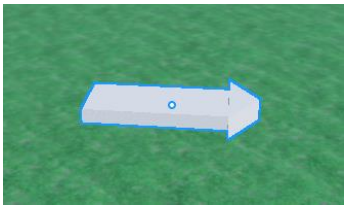
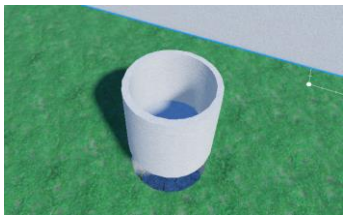
| 3D Model | Description | 3D Model | Description |
|---|---|---|---|
|  | Museum for infographic module |  | School for quiz module |
|  | Golf Field for golf game module |  | Teleport |
|  | Stick golf |  | Tree |

***Table 6:*** *3D Model Design (continued)*

| 3D Model | Description | 3D Model | Description |
|---|---|---|---|
|  | Bridge |   | Door for quiz module |
|  | Mountain |   | Non-Player Character (NPC) |
|  | Golf Ball |  | Spawn location |
|  | Quiz platform |  | Arrow direction |
|  | Golf Hole |  | Game Module Platform |

## 3.4 Main Function Development Stage

The Main Function Development Stage is an important part of the Golf World Game project because it's where all the main features and modules are built and put together to make a single, fully functional Roblox game. During this stage, two main activities were carried out, which were the development of these assets and the integration of them into Roblox Studio. The asset development process for the Golf World Game involves several key components that are essential to support the content and functionality of the application. These assets include text, graphics, audio, and 3D models. The development of each asset ensures that the application delivers an engaging and effective user experience, combining both educational content and entertaining gameplay.

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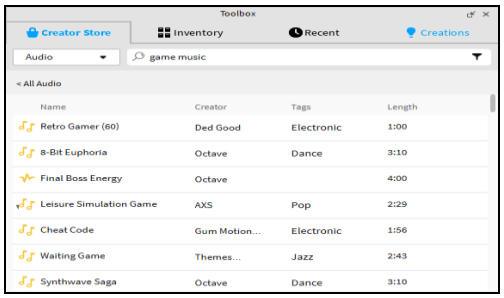
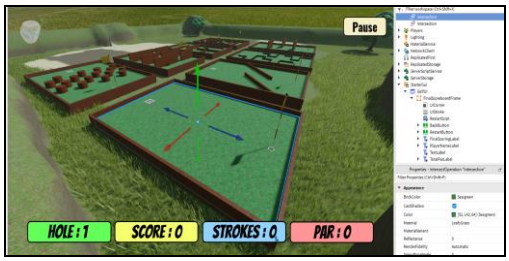
**Table 7** *Asset Development*

| Asset | Development | Explaination |
|---|---|---|
| Text |  | Text is one of the main assets in the Golf World Game, playing a crucial role in delivering important information to users across all three modules which is quiz, infographics, and the game module. |
| Graphic |  | Graphics are an essential asset in the Golf World Game, helping to create an attractive and engaging visual experience for users. These graphics help users better understand the learning content by supporting the text with relevant visual representations. |
| Audio |  | Audio is another important asset in the Golf World Game, used to enhance the overall atmosphere and provide feedback to the players during gameplay. In this game, audio elements are mainly implemented in the modules to give players a more immersive and engaging experience. Sound effects, such as the sound background, are used to provide immediate feedback for player actions. |
| 3D Model |  | 3D models are one of the main assets in the Golf World Game, especially for the game module, as they form the core elements of the gameplay environment. These models are used to create the golf courses, obstacles, holes, golf balls, and other objects necessary for an interactive golf experience. |

Integration in Roblox Studio involves the process of developing scripts using the Lua programming language to implement the core functionalities of the Golf World Game. These Lua scripts are written using the built-in Script and LocalScript components within Roblox Studio and serve to control various features across the application's three main modules: quiz, infographics, and the game module. Through scripting, interactions such as quiz answer checking, button navigation, score calculation, and player movement in the golf course are successfully implemented. The integration of scripting in Roblox Studio allows users to interact with the application in a smooth and structured manner, ensuring that each module operates according to its intended purpose. A systematic and organized approach to writing scripts is essential to guarantee that the application functions effectively, remains free of critical errors, and provides a positive experience for users.

**Table 8** *Asset Development*

| Function | Code Lua | Explaination |
|---|---|---|
| Pause Menu | backButton.MouseButton1Click:Connect(function()<br>print("Back to main world")<br>pauseMenu.Visible = false<br>local TeleportService = game:GetService("TeleportService")<br>local mainWorldPlaceId = 70503345261803 -- Replace with actual ID<br>TeleportService:Teleport(mainWorldPlaceId,game.Players.LocalPlayer)<br>end) | This script is connected to the Pause button located in the user interface of the 3 modules. When the Pause button is clicked, it triggers a function that toggles the visibility of the pause menu (a Frame component). This menu provides users with two key options: Resume to continue playing the game, or Back to return to the main world. |
| Camera And Aiming | local function getBall()<br>return workspace:FindFirstChild(player.Name .. "_Ball") or workspace:FindFirstChild("Ball")<br>end<br>runService.RenderStepped:Connect(function()<br>local ball = getBall()<br>if ball and ball:IsA("BasePart") then<br>local camOffset = Vector3.new(0, 20, 20) | This script provides players with the ability to rotate the camera around their golf ball and visually align their shots using an arrow indicator. The camera is set to Scriptable mode to give full control over the ball |
| Display Image | localbutton= game.Workspace:WaitForChild("grip")<br>localclickDetector= button:WaitForChild("ClickDetector")<br>localgui=script.Parent:WaitForChild("Frame5")<br>localfunction onClicked(player)gui.Visible=notgui.Visible<br>end<br>clickDetector.MouseClick:Connect(onClicked) | This script allows users to view images by interacting with 3D objects in the game world. In this case, a physical button object called “grip” is placed in the environment, and a ClickDetector is attached to it to detect when players click on it. |
| Game Module | local function handleHoleTouch(hole)<br>hole.Touched:Connect(function(hit)<br>if not (hit:IsA("BasePart") and (hit.Name == "Ball" or hit.Name:find("_Ball"))) then return end<br>localownerTag= hit:FindFirstChild("Owner")<br>local player = ownerTag and ownerTag.Value<br>ifnot(playerand player:IsA("Player")) then return end<br>iftouchingPlayers[player] then return end<br>touchingPlayers[player] = true<br>hit.Position = hole.Position - Vector3.new(0, 1, 0)<br>hit.Anchored = true<br>local sound = SoundTemplate:Clone()<br>sound.Parent = hole<br>sound:Play()<br>Debris:AddItem(sound, 5)<br>updateScore(player, 10) | This script handles the main functions of the golf game, including ball detection, score calculation, level progression, and player interactions with the holes. Each hole in the game environment is connected to the script using a .Touched event, which detects when a player's golf ball successfully enters a hole. |

***Table 8:*** *Asset Development (Continued)*

| | | |
|---|---|---|
| Quiz Module | `function playerCompletedQuiz(player)`<br>`quizCompleted[player.UserId] = true`<br>`end`<br>`localplatform=`<br>`game.Workspace:WaitForChild("Completion Platform")`<br>`platform.Touched:Connect(function(hit)`<br>`localplayer=`<br>`players:GetPlayerFromCharacter(hit.Parent)`<br>`if player and quizCompleted[player.UserId] then`<br>`stopTimer() -- Stop the timer on quiz success`<br>`quizSuccessEvent:FireClient(player) -- Notify the player of success`<br>`end`<br>`end)` | This module was developed to test players' knowledge of golf through a combination of interactive quizzes, countdown timers, and platform-based progression. The quiz system is designed to not only challenge users but also to add a sense of urgency and engagement by introducing a time limit for completion. |
| Timer Quiz | `local replicatedStorage = game:GetService("ReplicatedStorage")`<br>`local timerUpdateEvent = replicatedStorage:WaitForChild("TimerUpdate")`<br>`local timerDisplay = script.Parent:WaitForChild("TimerDisplay")`<br>`timerUpdateEvent.OnClientEvent:Connect(function(timeLeft)`<br>`--Calculate minutes and seconds`<br>`local minutes = math.floor(timeLeft / 60)`<br>`local seconds = timeLeft % 60` | The Quiz Timer Display script is responsible for showing the countdown timer visually on the player's screen during the quiz module. It works in conjunction with the server-side Quiz Timer by listening for updates through the TimerUpdate RemoteEvent stored in ReplicatedStorage. |

## 3.5 Testing Stage

The testing Stage is a crucial part of the development process for the Golf World Game, where the game is thoroughly tested to ensure it works correctly and provides a smooth experience for players. In this stage, the gameplay mechanics were carefully checked to ensure that all interactions, such as hitting the golf ball, the physics of the ball's movement, and the overall golf simulation, functioned as intended. The goal was to verify that the gameplay felt realistic and accurate, without any glitches or errors that could affect the player's experience. Functionality testing is shown in table 9.

***Table 9*** *Functionality Testing*

| Test | Expected Result | Actual Result | Correction |
|---|---|---|---|
| Navigation to Module Pages | Module Buttons Navigate to either the Golf Quiz, Golf Infographic, or Golf Game module. | Works as expected. | Not required. |
| Settings Button / Exit Button | Opens Settings Menu. Exits the application and returns to the main menu or closes the game. | | |
| Back / Home / Previous / Next | Back Button: Returns to the previous page. Home Button: Returns to Main World. Previous/Next: Navigates panels. | | |

***Table 9:*** *Functionality Testing (Continued)*

| | | | |
|---|---|---|---|
| Golf Quiz Module | Displays golf quiz questions and multiple-choice answers. Allows users to select answers and check for correctness. | Audio overlaps when clicking the question and answer audio simultaneously. | Add StopCurrentAudio() function to stop the current audio before playing the next one. |
| Golf Infographic Module | Displays golf-related information and facts using engaging visuals and text. | Works as expected. | Not required. |
| Game Module (Gameplay) | Allows players to play a fun golf mini-game with aiming, shooting, obstacles, and scoring system. | Pause button sometimes unresponsive. Scoring UI does not update correctly on some levels. | Add CheckPauseButton() function to verify pause state. Fix scoring logic in UpdateScore() function. |

## 4. Result and Discussion

This section discusses the analytical results obtained from the System Usability Scale (SUS) test. User acceptance testing, was conducted using the System Usability Scale (SUS) method. This test is important to ensure that the developed application meets user expectations and needs, as well as to gather feedback on its strengths and weaknesses. The testing was carried out at the UTHM and involved 20 respondents, consisting of 2 instructors and 18 UTHM students aged between 21 and 25 years old. Conclusion

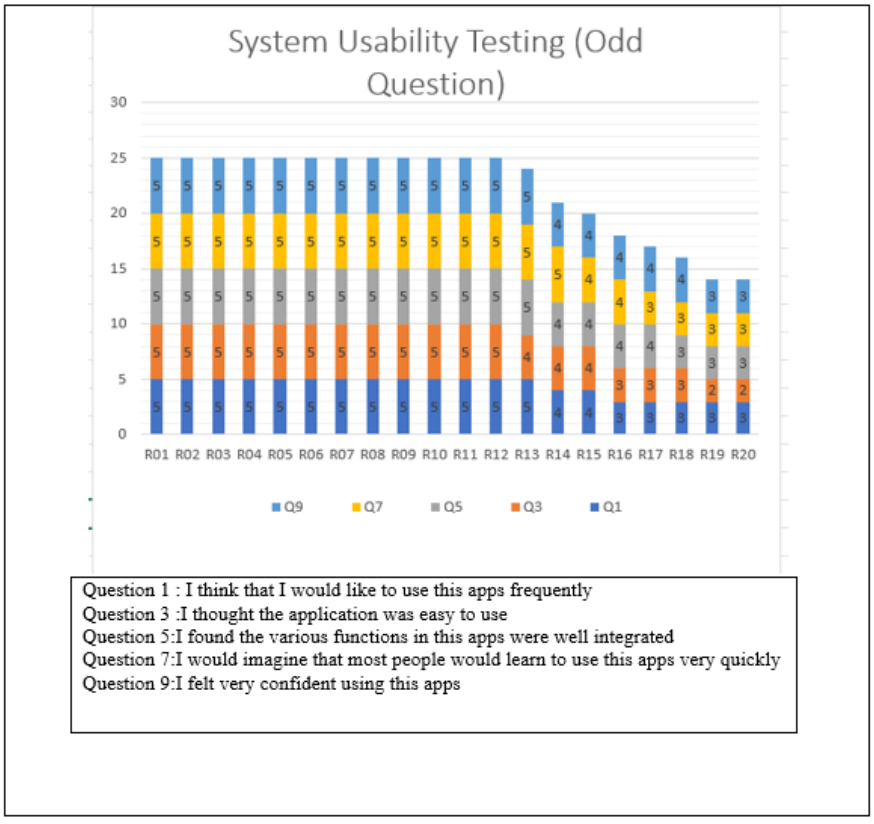



**Fig. 3** *Analysis for Odd (Positive) Questions*

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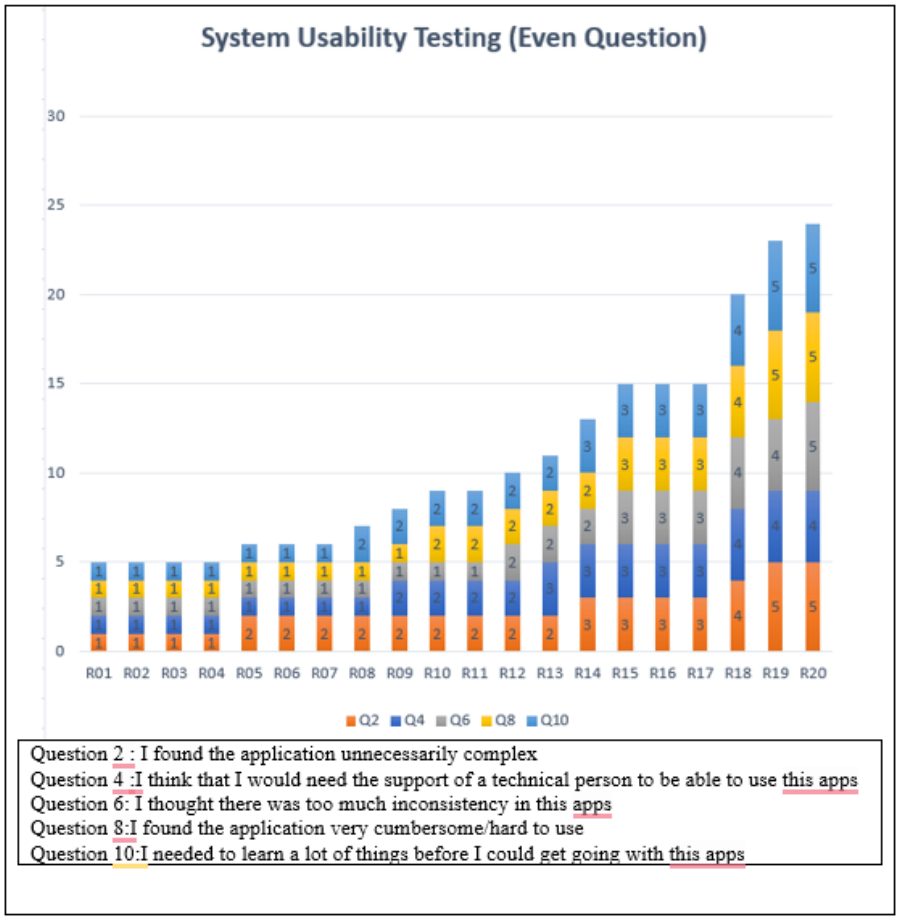


**Fig. 4** *Analysis for Odd (Negative) Questions*

The overall results for figure 3 and figure 4 are shown in figure 5 which shows average usability score for the Golf World Game.

| Responden | Skor Item | | | | | | | | | | Skor Ganjil | Skor Genap | Jumlah Skor |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | | | |
| R01 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 20 | 100 |
| R02 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 20 | 100 |
| R03 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 20 | 100 |
| R04 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 20 | 100 |
| R05 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 19 | 97.5 |
| R06 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 19 | 97.5 |
| R07 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 1 | 20 | 19 | 97.5 |
| R08 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 1 | 5 | 2 | 20 | 18 | 95 |
| R09 | 5 | 2 | 5 | 2 | 5 | 1 | 5 | 1 | 5 | 2 | 20 | 17 | 92.5 |
| R10 | 5 | 2 | 5 | 2 | 5 | 1 | 5 | 2 | 5 | 2 | 20 | 16 | 90 |
| R11 | 5 | 2 | 5 | 2 | 5 | 1 | 5 | 2 | 5 | 2 | 20 | 16 | 90 |
| R12 | 5 | 2 | 5 | 2 | 5 | 2 | 5 | 2 | 5 | 2 | 20 | 15 | 87.5 |
| R13 | 5 | 2 | 4 | 3 | 5 | 2 | 5 | 2 | 5 | 2 | 19 | 14 | 82.5 |
| R14 | 4 | 3 | 4 | 3 | 4 | 2 | 5 | 2 | 4 | 3 | 16 | 12 | 70 |
| R15 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 15 | 10 | 62.5 |
| R16 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 13 | 10 | 57.5 |
| R17 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 4 | 3 | 12 | 10 | 55 |
| R18 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 11 | 5 | 40 |
| R19 | 3 | 5 | 2 | 4 | 3 | 4 | 3 | 5 | 3 | 5 | 9 | 2 | 27.5 |
| R20 | 3 | 5 | 2 | 4 | 3 | 5 | 3 | 5 | 3 | 5 | 9 | 1 | 25 |
| | | | | | | | | | | | | **Skor Purata** | **78.38** |

**Fig.5** *Average Usability Score*

Based on Figure 5, the average usability score for the Golf World Game application is 78.38, which falls under the "Good" category as shown in Figure 5.17. This indicates that the application is well-accepted by users in terms of its usability.

## 5. Conclusion

The Golf World Game has been successfully developed. The main goal to design a user friendly that is visually appealing and easy for user to play was accomplished, along with the secondary objectives of develop an interactive module that provides convenience to users and knowledge about golf. Feedback from target users was positive, as shown by the strong System Usability Scale (SUS) scores. Table 10 shows the advantages and disadvantages of the Golf World Game.

**Table 10** *Advantages* and disadvantages of *Golf World Game*

| Advantages | Disadvantages |
|---|---|
| Three integrated modules (Quiz, Infographics, 3D Gameplay) that combine learning with entertainment, providing a well-rounded, game-based learning experience about golf. | Three The 3D golf gameplay may experience performance issues on low-end devices, which can affect the game's smoothness. |
| A user-friendly interface designed to suit players of various ages, making it easy to navigate between modules and enjoy the learning content. | The quiz questions are limited in number, which may reduce replay value once users become familiar with the answers. |

**Table 10** *Continue*

| Advantages | Disadvantages |
|---|---|
| Educational infographics that explain golf-related topics in a visually appealing and easy-to-understand manner, helping players grasp the fundamentals of golf. | Some infographic content lacks interactivity, which could make the learning experience less engaging for certain users. |
| Encourages active learning by blending educational content with practical application in the 3D golf module, fostering better retention of knowledge. | The game currently supports only one language (English), which may limit accessibility for a wider audience. |

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## Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

## Author Contribution

The authors confirm contribution to the paper as follows: **study conception and design:** Muhammad Izzat Mat Yunus, Azizan Ismail; **data collection** Muhammad Izzat Mat Yunus, Azizan Ismail; **analysis and interpretation of results:** Muhammad Izzat Mat Yunus, Azizan Ismail; **draft manuscript preparation:** Muhammad Izzat Mat Yunus, Azizan Ismail. All authors reviewed the results and approved the final version of the manuscript.

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## Appendix A: Main World Flowchart

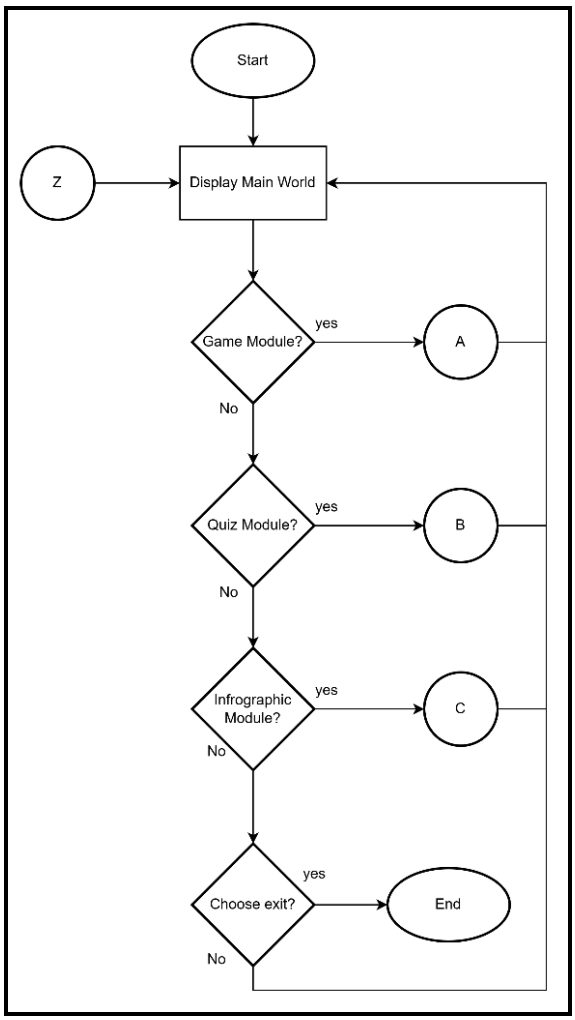


**Fig. 6** Main World Flowchart

## Appendix B: Game Module Flowchart

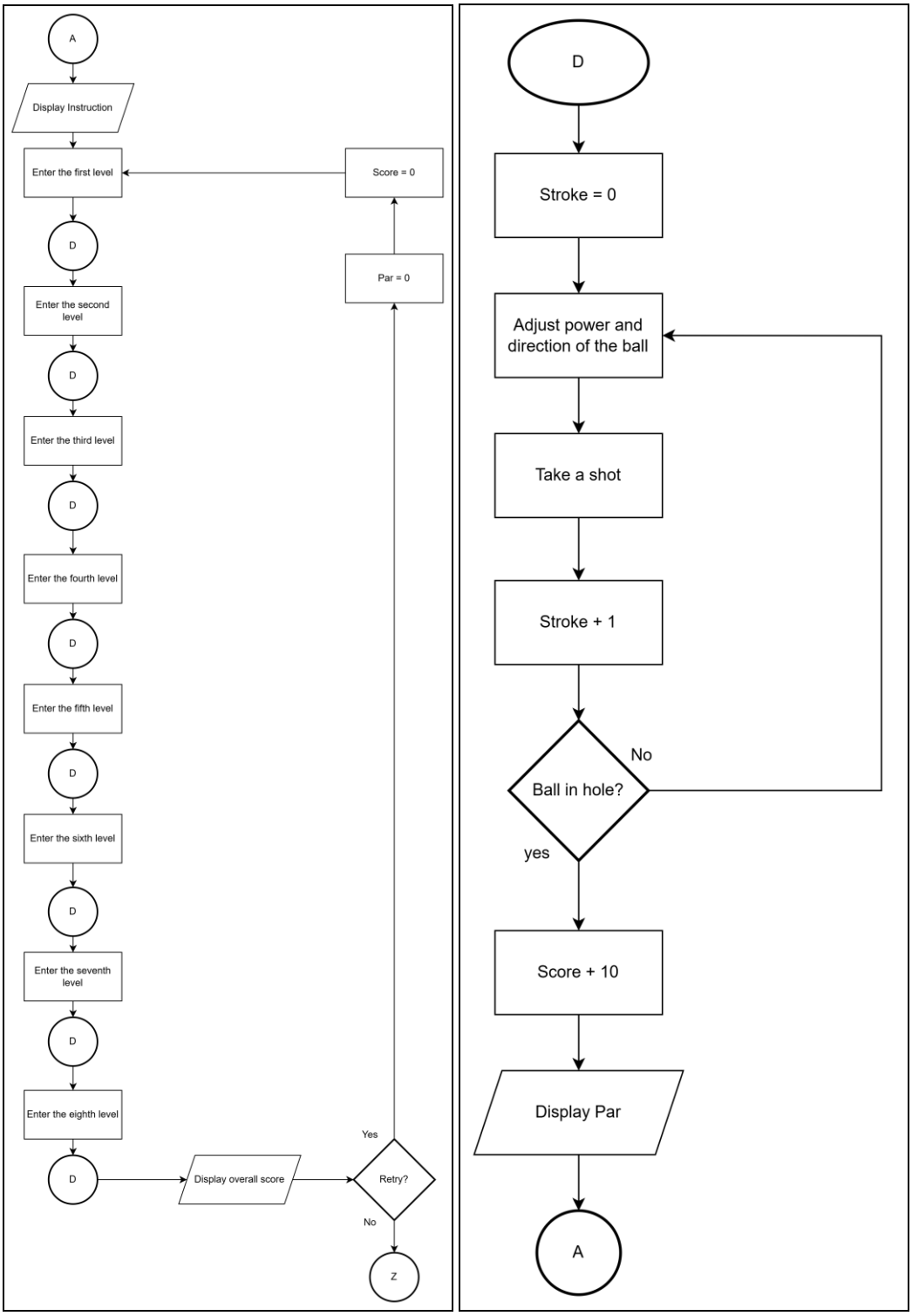


**Fig.7** Game Module Flowchart and its connector

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## Appendix C: Quiz Flowchart

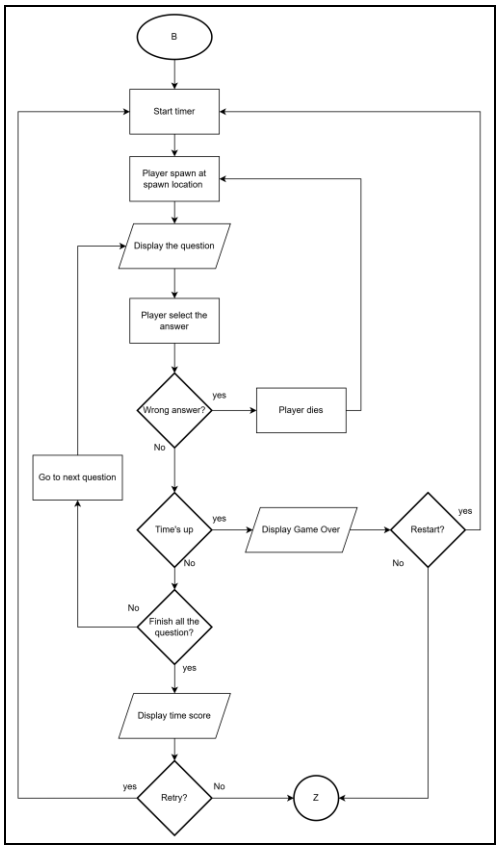


**Fig.8** Quiz Module Flowchart

## Appendix D: Infographic Module Flowchart

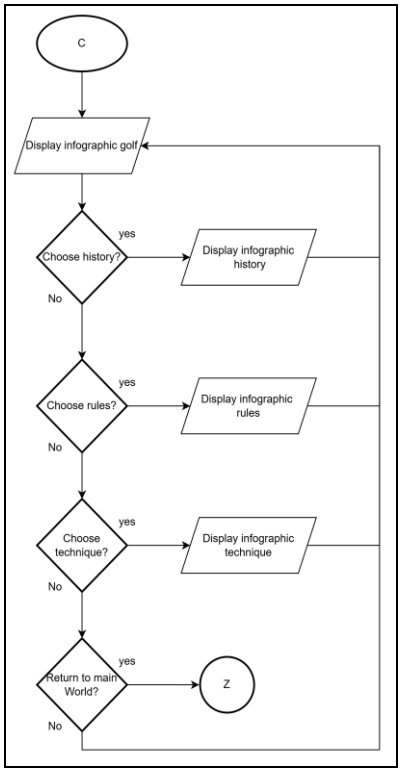

**Fig.9** Infographic Module Flowchart

## Appendix E: Navigation Structure

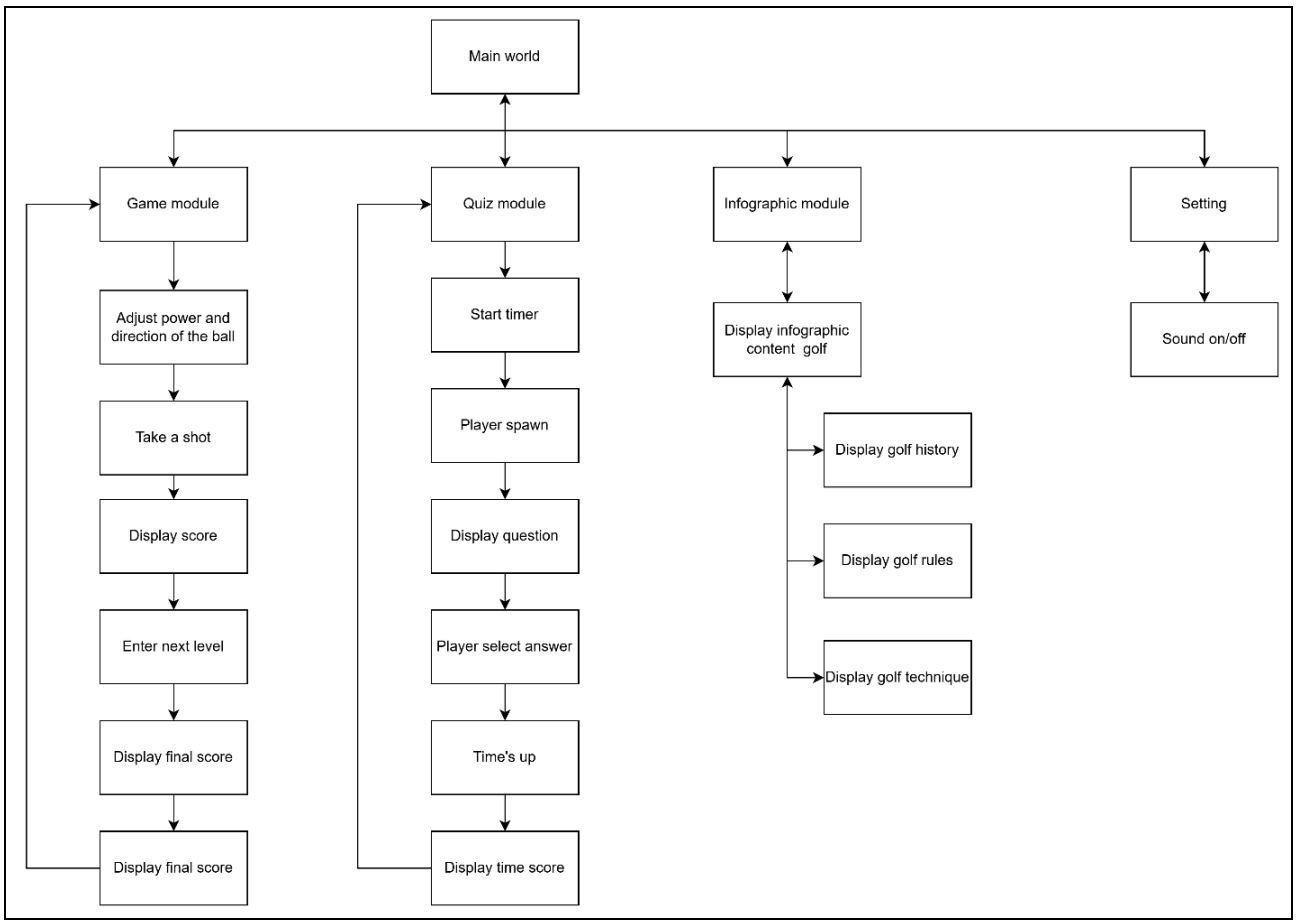


**Fig.10** *Navigation Structure*

## Appendix F: Content Structure

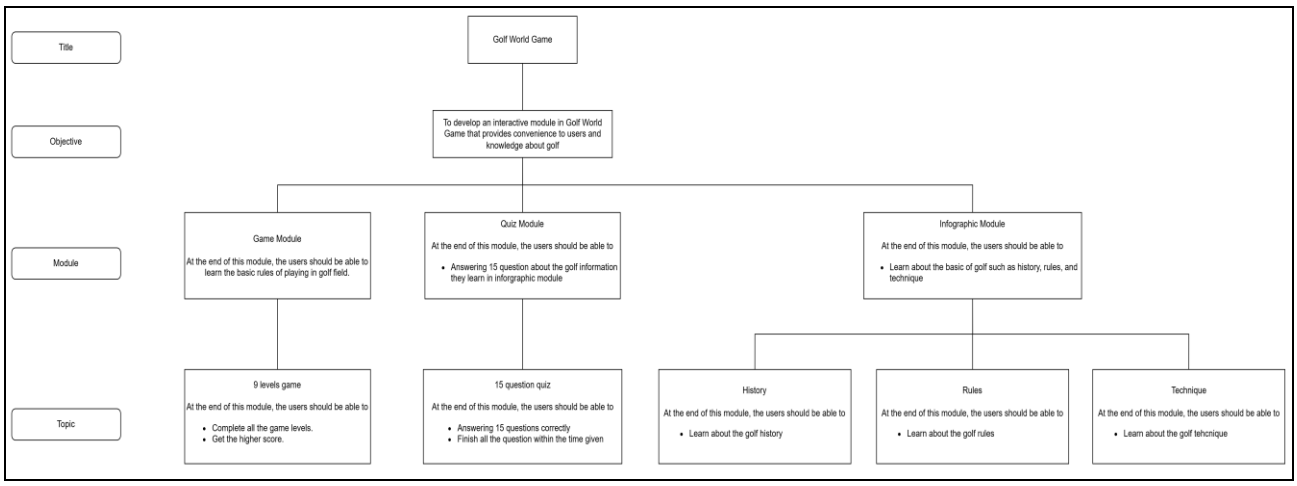


**Fig.11** *Content Structure*