

Jom Berkhemah: A 3D Desktop Game

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Abstract

Learning from books, videos, or even short survival courses is not enough to give people the real experience they need to survive in the wild. Jom Berkhemah helped teach these survival skills in a fun and interactive way. The game is for target audiences aged 12 to 18 and uses the Game Development Life Cycle (GDLC) method. Players can try out real survival activities, such as crafting tools or finding food, inventory management while also keeping track of things like hunger and energy levels. User acceptance is conducted through System Usable Scale (SUS) to evaluate functionality of the game. The game achieved a SUS score of 85.75, which was considered excellent in testing. Overall, the result shows user satisfaction with the game application. By implementing the 3D Survival gameplay, the game hopes to give some knowledge about the survival's skills for emergency matter and learn in the most exciting way. In conclusion, Jom Berkhemah proves to be suitable for enhancing survival skills through interactive and engaging way.

1. Introduction

Survival skills are often taught through traditional methods like books, or videos. While informative, these methods lack immersive, hands-on experiences that are vital for better retention and application of skills. In typical survival camps or training sessions, participants rely on instructors for guidance, limiting their independence in applying these skills in real-world scenarios. There is a gap in interactive learning tools that simulate real survival situations, where learners can practice tasks such as crafting tools, gathering food, and managing health in a dynamic environment [1] that simulate real survival situations and practice tasks, such as crafting tools, gathering food, and managing health in a dynamic environment. This project domain was selected because it addresses a clear gap in how survival knowledge is taught and retained.

Jom Berkhemah offers a solution to these challenges by presenting an interactive survival simulation game. This approach to learning survival techniques, including shelter or tent building, crafting tools, food sourcing, and water purification, allows players to develop problem-solving and decision-making skills in an engaging way, low-risk environment while tracking important survival indicators like health, hunger, and energy [2]. The game offers a unique way to learn about survival skills wherever you are. Learning from books, videos, or even short survival courses is not enough to give people the real experience they need to survive in the wild. This lack of practical survival knowledge can cause real problems. For example, if people get lost while hiking or camping, they may not know safe drinking water or making shelter. Surviving in the woods is difficult, but it can be done by drinking, food and shelter as basic human needs [3].

Therefore, this project aims to design the survival game based on first person view that can enhance player survival skills that can be adapt in real life, develop a 3D game that tracks key survival metrics such as health, hunger, sleep, resource management in desktop platform and evaluate usability and functionality of Jom

Berkhemah game through user feedback and testing. The proposed game application is designed for aged 12 to 18 years old, particularly primary and secondary schools' students because they need some awareness about survival skills from school in the most engaging way. The application is divided into several key modules. The Crafting Module teaches players how to create shelters and essential tools like knives, axes, and fire starters. The Inventory and Resource Gathering Module allows users to collect and manage resources such as wood, leaves, and stones. The Food and Water Module helps players learn how to hunt, fish, and purify water for survival, while the Health and Survival Metrics Module tracks important survival indicators such as hunger, thirst, energy, and health. With these modules created can maintain positive balance for the strength and experience of survival [4]. The game follows the Game Development Life Cycle (GDLC) methodology to ensure a structured development process. Expected outcome of the project, in the of the project this game will be developed in desktop and aims immersive survival games that help players develop practical survival skills they can use in real-life situations.

The rest of the paper is arranged as follows: Section 2 covers the domain of study, the technology used, and the result of the comparative analysis. Section 3 describes the Game Development Life Cycle (GDLC) [5] methodology that has been chosen to be used in this project, as well as the output of the analysis and design phases of this project. Furthermore, Section 4 discusses the result and discussion, while Section 5 states the conclusion of the current progress.

2. Related Work

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

2.1 Survival Skills

Learning survival skills is a must either male or female because of emergency preparedness. Young adults and teenagers love camping because it gives them the chance to gain teamwork and survival skills. Students between the ages of 12 and 18 can learn important life skills like creative thinking and problem-solving. To encourage students practical learning and give students the opportunity to move outside of their comfort zones and learn how to deal with difficulties, many educational institutions and outdoor groups include camping experiences in their curriculum [6]. Forest survival skills are currently provided, mostly guided by instructor's courses, physical books, and conventional outdoor training camps. Experienced instructors who provide demonstrations of methods such as building a tent, locating clean water, and making equipment are key to these techniques. Although their effectiveness, these approaches are frequently limited by practical issues including restricted access to outdoor areas and the high expense of planning field trips. Additionally, a lot of current applications, such as Muck, The Forest, and Minecraft, are more entertaining than educational value to those who are looking to learn important survival skills [7]. Jom Berkhemah implements 3D technology so the target users which are students can interact with the game along with lessons so they can learn something about survival.

2.2 3D Technology environment

Jom Berkhemah uses survival-based 3D gaming technologies first per view on a desktop platform. Using three-dimensional graphics, 3D games technology makes games appear to be more accurate. Many games use 3D technology to make survival interesting. For example, Muck is a fast-paced game where players collect items, craft tools, and fight enemies to survive. The Forest gives players a realistic forest to explore, where they must find food and fight to stay alive. Minecraft is a creative sandbox game where players build and survive in survival. While these games are fun, they focus more on entertainment than on teaching real survival skills. Jom Berkhemah combines fun and education with 3D gaming. By teaching players important survival skills like building a shelter, gathering food, and purifying water, it enhances other games and makes them more beneficial and educational [8].

2.3 Comparative analysis

Comparative analyses were conducted on three related applications to the proposed application. The three applications are Muck [9], The Forest [10] and Minecraft [11] as shown in Fig.1(a), (b), and (c) respectively. Table 1 shows the result of comparative analysis.

The comparison between the three reviewed applications and the proposed application will be evaluated in table 1 below. The three reviewed applications are Muck, The Forest, and Minecraft, while the proposed application is called Jom Berkhemah. A total of nine aspects will be examined during the comparison, which are language content, target audience, educational value, crafting system, graphic, multiplayer, day tracking and health system, strength, limitations.

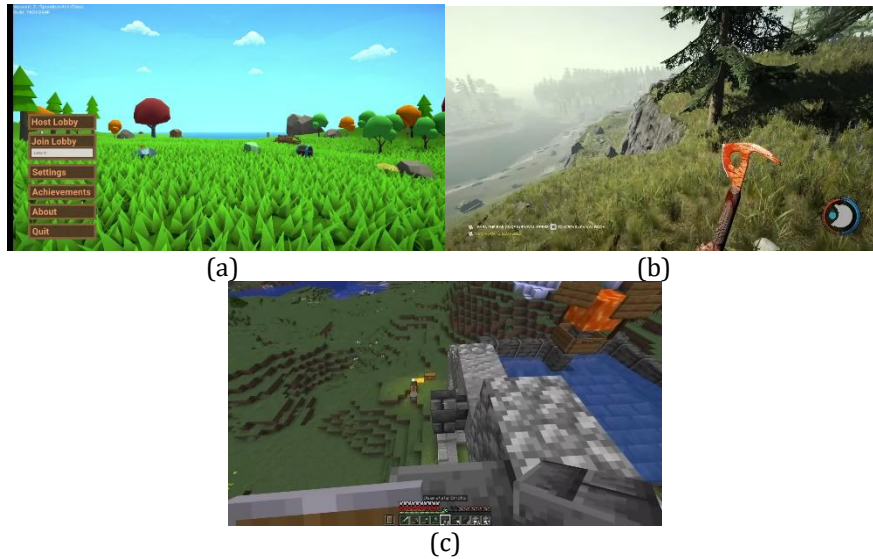


Fig. 1 (a) *Muck* [9]; (b) *The Forest* [10]; (c) *Minecraft* [11]

Table 1 *Application Comparison*

Features/ Applications	Muck	The Forest	Minecraft	Jom Berkhemah
Language Content	English	English	English	Malay
Target Audience	General audience, no age restriction	Teens and adults, survival/horror fans	All ages, especially creative players	Young learners (12-18 years old), educational focus
Education Value	No educational focus	More to horror twist in survival	Encourages problem solving, but not survival education	Focus on survival learning
Crafting System	Simple crafting system	Advanced crafting system	Extensive crafting	Teach practical crafting like tools and shelters
Graphic	3D Graphics, Low poly Graphics	3D Graphics, Medium Poly 3D	3D graphics, Blocky	3D Graphics, Low poly graphics
Multiplayer	Multiplayer mode available			Single player because it is designed for individual learning
Day Tracking and Health System	No health system, focus on combat and exploration	Yes, health system and day tracking for survival	Yes, health system and day tracking for survival	Yes, health points, hunger, and sleep tracking to simulate real survival situations

Table 1: (continued)

Strengths	Fun and fast-paced gameplay	Realistic survival experience with immersive environment	Creative building and exploration	Educational with real survival training. Fun and engaging gameplay for learning survival
Limitation	Lacks educational content, basic survival elements	More to horror than survival itself. Not suitable for all players	Focus on creativity. Lack of practical survival learning.	Single player only, limit social learning experience.
Building Mechanics	Basic, limited to utility	Complex, realistic structures	Extensive, own creativity	Basic with functional and not fancy

According to Table 1, Jom Berkhemah was compared to existing games such as Muck, The Forest, and Minecraft. While these games have their own appeal, they each have limitations that Jom Berkhemah addresses. Unlike the other games which are in English, Jom Berkhemah uses Malay, making it more relatable for Malaysian youth aged 12 to 18. In terms of educational value, Muck is purely for entertainment, The Forest focuses on survival with a horror theme, and Minecraft emphasizes creativity rather than real survival skills. Jom Berkhemah stands out by teaching practical survival techniques such as shelter building and tool crafting, tailored for real-life applications.

The crafting systems across the games vary in complexity, but Jom Berkhemah keeps it simple and focused on essential survival items, ensuring accessibility for younger players. Graphically, while Muck and Minecraft use basic or blocky visuals and The Forest offers realism, Jom Berkhemah balances basic 3D visuals with educational clarity. Unlike the others, it is designed for single player to help players concentrate on learning, though it lacks the multiplayer interaction found in the compared games.

Survival tracking is also more comprehensive in Jom Berkhemah, covering health, hunger, energy, and sleep, providing a well-rounded survival simulation. Overall, Jom Berkhemah combines the best elements of resource gathering and crafting from Muck and Minecraft, with the survival depth of The Forest, but repackaged as an educational tool focused on real survival skills for Malaysian students.

3.0 Methodology

Jom Berkhemah has been developing Game Development Life Cycle (GDLC) [5]. The Game Development Life Cycle (GDLC) is the method used to develop the game Jom Berkhemah. This methodology approach is popular in game development because it provides a clear and step-by-step process to guide development from start to finish. GDLC methodology makes sure that each task of the game development is carefully planned, tested, and improved the game quality in every aspect. The GDLC method has six main phases which are initiation, pre-production, production, testing, beta, and release.

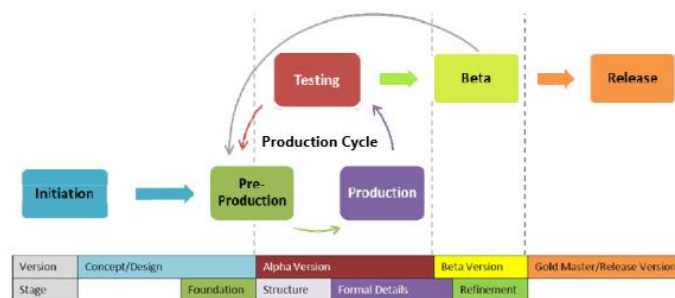


Fig.2 Game Development Life Cycle (GDLC) [5]

3.2.1 Initiation phase

The main ideas and objectives of the game are planned in this beginning phase using a Gantt chart. This stage determines the game's objective, including who will play it, who will be its target audience, and what the player will learn from the game. Also, all information from Subject Matter Experts (SME) which is Captain Akmal Aiman bin Abd Razak was collected. Determining the survival skills teaching focus, building and crafting systems, and the basic gameplay concepts were all part of this phase for Jom Berkhemah. The concept document and an early project plan outline are the main outputs of this phase. All the requirements are gathered like user requirements at Table 2, functional requirements at Table 3 and non-functional requirements at Table 4.

Table 2 *User Requirements analysis*

Participant	Role in the project	User Requirement
Captain Akmal Aiman bin Abd Razak (SME)	ROTU UTHM Trainer Officer	<ul style="list-style-type: none"> • Approved of the planned activity module for the proposed game • Suggested focusing on basic skills first, like building shelters first, finding food, and purifying water • Suggested game to be simple but realistic visuals, adding weather effects, and keeping the controls easy to use. • Suggested testing the game to ensure it is not too hard or too easy. • Suggested including a progress tracker and be suitable for schools or training programs

Table 3 *Functional Requirements analysis*

No	Functional Requirements	Module	Description
1.	User Interaction	Main Interface	<ul style="list-style-type: none"> • Main interface scene guide users to go anywhere (Settings, continue, exit the game and create a new game).
		Settings	<ul style="list-style-type: none"> • The system should provide users with the ability to control the music and sounds.
		Food and water module	<ul style="list-style-type: none"> • Help players learn how to hunt, fish, and purify water for survival .
		Crafting Module	<ul style="list-style-type: none"> • How to create shelters and essential tools like knives, axes, and fire starters.

Table 3: (continued)

	Inventory and resource gathering module	<ul style="list-style-type: none"> Allows users to collect and manage resources such as wood, leaves, and stone. allow users to store some tools like axe, pickaxe, fishing rod and more.
	Survival Metric Module	<ul style="list-style-type: none"> Tracks important survival indicators such as hunger, energy, and health. Hunger will decrease when users do too much work at the same time. Energy will decrease when users sprint too much Health will decrease either hunger or energy become low.
2. Autonomous System Activites	Event Trigger System	<ul style="list-style-type: none"> Game events are triggered when health is below 20% that will make the player slower than normal.

Table 4 Non-Functional Requirements analysis

No	Requirement	Description
1	Performance	<ul style="list-style-type: none"> The game must run at least 30 Frame Per Second (FPS) during gameplay
2	Operational	<ul style="list-style-type: none"> The game must run in Windows 7 and above and at least game runs in 4GB ram.
3	Usability	<ul style="list-style-type: none"> The user interface must be simple and can be understood by user.
4	Legal	<ul style="list-style-type: none"> The game must follow the copyright law, using appropriate material, stock, and licensed.
5	Cultural	<ul style="list-style-type: none"> The application should be developed in Malay language.

3.2.2 Pre-Production Phase

In this phase, the focus is on planning the game in more detail. This includes deciding on the storyline, designing the characters model and button from Table 5 as this game follows Game Design Document (GDD) at Table 6, creating the game's environment, and figuring out how the game will work. For Jom Berkhemah, tools such as Unity for the game engine and 3D modeling software which is blender were chosen. Prototypes were created to help guide the next steps in development. The result is a solid plan that will be used during the production phase.

Table 5 *Button and Icon Design*


















Button	Description	Button	Description
	<ul style="list-style-type: none"> This is a start button. Will bring user to go to new game. Will bring users into low poly 3D environment gameplay. 		<ul style="list-style-type: none"> This is Save button manually save the game Will save all the data related (Player position, inventory, survival indicator, day counter).
	<ul style="list-style-type: none"> This is a continue button Will bring users to go to continue the local saved game 		<ul style="list-style-type: none"> Tick button to confirm the deletion of the UI panel (Saved Game List).
	<ul style="list-style-type: none"> This is setting button. Will bring to the user to set the volume of sound and music. 		<ul style="list-style-type: none"> X button to close the panel.
	<ul style="list-style-type: none"> This is exit game button. Will bring to user to exit the game. 		<ul style="list-style-type: none"> Sound effect button to show the user to interact with the sound effect slider.
	<ul style="list-style-type: none"> This is back button Back button for returning to main menu or back to inventory mode 		<ul style="list-style-type: none"> Music background button shows the user to interact with the music effect slider.
	<ul style="list-style-type: none"> This is the burger button. Will display and pause the game whenever the user wants to exit the game or away from keyboard and open the settings. 		<ul style="list-style-type: none"> “Tambah permainan” Button to add.
	<ul style="list-style-type: none"> This is the close button. Close button is for exiting the inventory or crafting mode. 		<ul style="list-style-type: none"> This is a trash button so the user can delete the item that the user does not want.
	<ul style="list-style-type: none"> This is the inventory icon. This icon will show user to click 'I' on the keyboard to navigate crafting interface. 		<ul style="list-style-type: none"> This is a craft button. This button will craft the tool that the user needs when the material is enough.
	<ul style="list-style-type: none"> This is a crafting icon. This icon will show user to click 'C' on the keyboard to navigate crafting interface. 		

Table 6 *Game Design Document (GDD) Table*

No	Blueprint	Description	No	Blueprint	Description
1	Game Name	<ul style="list-style-type: none"> The game is titled Jom Berkhemah, which can be defined as Let's Go Camping. 	8	Replaying and Saving	<ul style="list-style-type: none"> A save and load system allows players to save their progress manually. Players can reload previous saves to continue where they left off,
2	Game Overview	<ul style="list-style-type: none"> Jom Berkhemah is a first-person survival simulation game designed to teach players essential survival techniques The game is educational, with a focus on outdoor contexts, targeting younger. 	9	Story, Setting Character	<ul style="list-style-type: none"> The game is set in a Malaysian forest, with the player taking on the role of an anonymous camper. The setting emphasizes nature and the challenges

Table 6: (continued)

3	Game Flow Summary	<ul style="list-style-type: none"> • Players start in a forest environment where they must explore, gather resources, craft items, and maintain their health, hunger, and energy levels. • A simple user interface guides players through tasks and objectives, helping them understand what to do next. 	10	Level	<ul style="list-style-type: none"> • Jom Berkhemah does not have multiple levels but is designed as an open environment that players can explore freely. • The learning curve is embedded within the survival tasks rather than traditional level progression.
4	Look and Feel	<ul style="list-style-type: none"> • The game features a low-poly, stylized art style with a bright and inviting color palette. • It is visually designed to be approachable for younger audiences while maintaining the realism necessary for survival education. • The environment feels natural, with dynamic lighting for day and night cycles. 	11	Interface	<ul style="list-style-type: none"> • The user interface includes health, hunger, and energy bars, an inventory screen, a crafting menu, and interaction text for guidance. • A crosshair in the center of the screen assists with interaction targeting. • Menus are minimalistic and designed to keep the screen consistent during gameplay.
5	Gameplay	<ul style="list-style-type: none"> • The core gameplay includes resource gathering, crafting tools, building shelters, and managing survival stats. • Players are encouraged to explore and interact with the environment to learn how to sustain themselves in nature. • 	12	Artificial Intelligence	<ul style="list-style-type: none"> • The game does not feature enemy AI or combat systems. • Environmental interactions are scripted, and the player's challenge comes from managing survival stats and resource limitations rather than from active opponents.
6	Mechanic	<ul style="list-style-type: none"> • The game's mechanics are maintaining health, hunger, energy, and stamina management. • Players must balance these stats by eating, resting, and crafting necessary tools. • The crafting system requires specific items to create new tools, encouraging resource planning. 	13	Technical	<ul style="list-style-type: none"> • The game is developed using Unity and C# scripting. • It is designed to run on Windows platforms with minimal system requirements, ensuring compatibility with school and personal computers. • No network connection is required as the game is fully offline.
7	Game Options	<ul style="list-style-type: none"> • The game includes options to adjust audio settings, toggle full-screen mode, and view control settings. • Players can also reset their progress or start a new game through the main menu. 	14	Game Art	<ul style="list-style-type: none"> • All models and assets are created using Blender, with textures and materials applied in Unity. The art style is low poly, ensuring performance efficiency while keeping the visual presentation clear.

A storyboard and interface acts as a game plan for Jom Berkhemah. It serves as a design document where the game's ideas are illustrated and arranged in step-by-step order. This helps in visualizing the development and flow of the game. The storyboard for Jom Berkhemah includes sketches of all the interfaces, along with descriptions of buttons, graphics, text, audio, and other elements as shown in Table 7.

Table 7 Storyboard and interface of game application



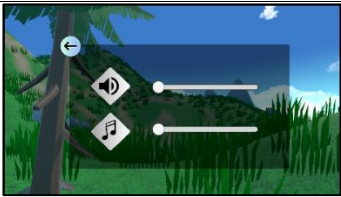

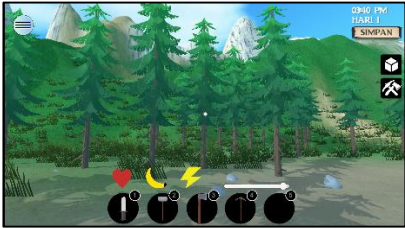
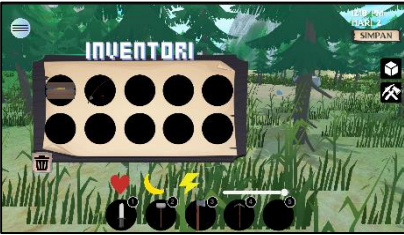
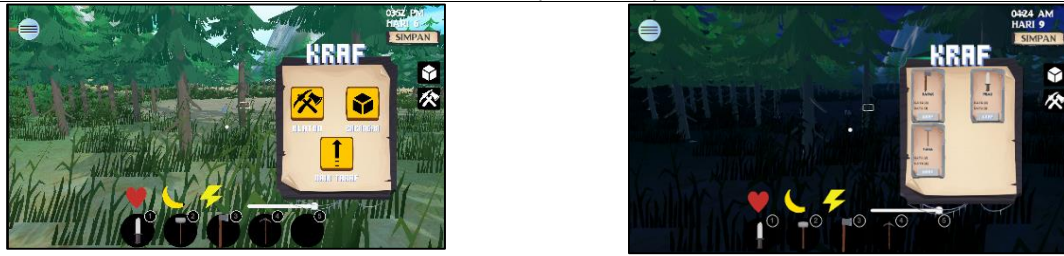
Items	Items
	
<ul style="list-style-type: none"> • This is the main menu of the application. • The start button will bring the users to the new game. • The continue button will bring the users to go to saved game first. • The setting button will bring the user to go to setting interface. • The exit button will bring the user to exit the application. 	<ul style="list-style-type: none"> • This is the saved game interface • The back button will bring the users back to the main menu. • Any saved game will display a game that already saved in a local
	
<ul style="list-style-type: none"> • This is the setting interface • The back button will bring the users back to the main menu. • Sound effect slider is for users who want to adjust the sound in the game. • Music slider is for user who want to adjust the music background in the game. 	<ul style="list-style-type: none"> • Interface when user click start button and 'Nama Permainan' Panel will pop out. When user click 'Tambah Permainan' it will open a new save game file and user can play the game.
	
<ul style="list-style-type: none"> • This is a game interface • The burger button will popout when clicking if the users want to pause the game to open settings, away from keyboard and want to exit the application. 	<ul style="list-style-type: none"> • This is an inventory interface. • Slot inventory objects will show the material that we gathered in the inventory.

Table 7: (continued)



- This is crafting interface.
- Slot crafting objects will show when the user wants to build a tool or something.
- This is craft tool interface.
- The back button will bring the user to go back to crafting mode interface.
- The craft button is for users who need to craft tool based on the material gathered.

3.2.3 Production Phase

The actual development of the Jom Berkhemah takes place during the Production Phase. The game's mechanics, characters, animation, and environment are created in detail to make sure the game is harmonious and consistent. The environment of game assets was shown at Table 9. Coding and implementation are done for features like making tools, gathering resources, and tracking survival indicators (such hunger, energy, and health). To enhance the game aesthetic, 3D elements and animations are created so the game looks more engaging and realistic. To create and polish the game, makes use of programs like Unity and C# programming source code. By the end of this phase, any issues or errors have been fixed to make sure that everything functions as expected. One of the animation tools is shown in Table 8 below.

At this phase, the development of the game will proceed to make the main function of Jom Berkhemah. This stage involves developing the game assets for the game application such as graphics, audio, and animations, and integrating these assets into Unity. The integration of C# scripts of the game application will be implemented in this phase of development as shown in Table 10 to make sure the game will function well. There are several core components needed for this game to make it perform well. Some of these components will be chosen and shown in this section. The scripts handle the player movements and interactions with the game environment, inventory system, crafting system, survival indicator and save system to make sure the game perform well. Table 3 shows the script for those functions.

Table 8 'Kapak' Animation Design

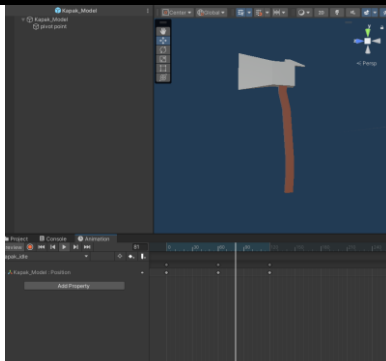
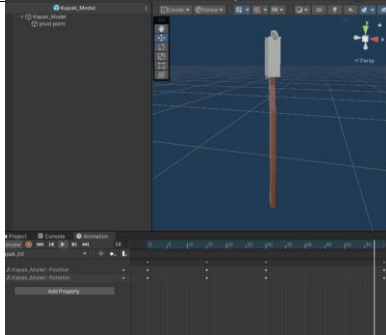
Animation Condition	Design
Idle Animation (Involve position only)	
Hit Animation (Involve Position and rotation of the tools)	

Table 9 Development of game assets


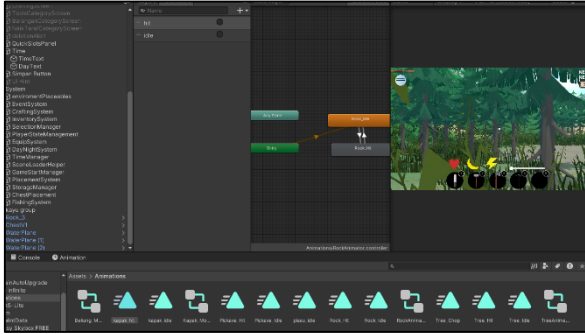
Asset	Items	Description
Graphic		<ul style="list-style-type: none"> Unity can redesign the shader environment and lighting to make the graphics even cooler Modelling was made in Blender tool to make sure the consistency of modelling and the world environment
Animation		<ul style="list-style-type: none"> Unity used to make different animation using animation controllers to make sure the game does not static.

Table 10 C# Script for Jom Berkhemah: A 3D Desktop Game

Function	Source Code	Description
Equip System (EquipSystem.cs)	<pre> 1 reference GameObject GetSelectedItem(int slotNumber) { return quickSlotsList[slotNumber - 1].transform.GetChild(0).gameObject; } bool checkIfSlotIsFull(int slotNumber) { if (quickSlotsList[slotNumber - 1].transform.childCount > 0) { return true; } return false; } </pre>	<ul style="list-style-type: none"> This method returns the currently selected item GameObject from a specific quick slot based on the slot number. It assumes that each slot has exactly one child item.
Inventory System (InventorySystem.cs)	<pre> public void AddToInventory(string itemName) { GameObject existingStack = FindExistingStack(itemName); if (existingStack != null) { InventoryItem item = existingStack.GetComponent<InventoryItem>(); if (item.quantity < 32) { item.quantity++; item.UpdateQuantityUI(); RecalculateList(); return; } } if (CheckIfFull()) { Debug.LogWarning("Inventory is full!"); return; } GameObject slot = FindNextEmptySlot(); if (slot == null) { Debug.LogWarning("No empty slot found!"); return; } GameObject itemPrefab = Resources.Load<GameObject>(itemName); if (itemPrefab == null) { Debug.LogError(\$"Missing prefab in Resources: {itemName}"); return; } } </pre>	<ul style="list-style-type: none"> Adds an item to the player's inventory. If the item already exists and its stack is not full, it increases the quantity. If no stack is available or the inventory is full, it instantiates the item prefab and adds it to the next available empty slot. This method also triggers a visual pickup notification.

Table 10: (continued)

<p>Crafting System (CraftingSystem.cs)</p>	<pre>public void CraftAnyItem(BlueprintSO blueprint) { for (int i = 0; i < blueprint.NumOfRequirements; i++) { if (InventorySystem.Instance.CountItem(blueprint.requiredItems[i]) < blueprint.requiredItemAmounts[i]) { Debug.LogWarning("Not enough items to craft!"); return; } } for (int i = 0; i < blueprint.NumOfRequirements; i++) { InventorySystem.Instance.RemoveItem(blueprint.requiredItems[i], blueprint.requiredItemAmounts[i]); } InventorySystem.Instance.AddToInventory(blueprint.itemName); StartCoroutine(DelayedInventoryUpdate()); }</pre>	<ul style="list-style-type: none"> • Crafts an item based on the provided blueprint. It checks if the player has all required resources. If so, it removes the used resources from the inventory and adds the crafted item. If not, it logs a warning message.
<p>Save System (SaveManager.cs)</p>	<pre>public SaveData LoadGame(string saveName) { string path = GetSavePath(saveName); if (!File.Exists(path)) { Debug.LogError(\$"Save file '{saveName}' not found."); return null; } string json = File.ReadAllText(path); return JsonUtility.FromJson<SaveData>(json); }</pre>	<ul style="list-style-type: none"> • Loads save data from a JSON file by reading its content. If the file does not exist at the expected path, a warning is logged, and null is returned. Otherwise, the save data is deserialized and returned.
<p>Player State System (PlayerState.cs)</p>	<pre>private void UpdateUIBars() { if (staminaSlider != null) staminaSlider.value = currentStamina / maxStamina; if (healthFill != null) healthFill.fillAmount = currentHealth / maxHealth; if (hungerFill != null) hungerFill.fillAmount = currentHunger / maxHunger; if (energyFill != null) energyFill.fillAmount = currentEnergy / maxEnergy; }</pre>	<ul style="list-style-type: none"> • Updates the UI bars that represent player stats such as stamina, health, hunger, and energy. Each bar's value is set based on the current value relative to the maximum.
<p>Placement System (PlacementSystem.cs)</p>	<pre>private void PlaceItem() { itemToBePlaced.transform.SetParent(environmentPlaceables.transform, true); var placeable = itemToBePlaced.GetComponent<PlaceableItem>(); if (placeable != null) { placeable.SetDefaultColor(); placeable.enabled = false; } var chest = itemToBePlaced.GetComponent<StorageBox>(); if (chest != null) { chest.chestID = GenerateNewChestID(); } // Remove model from hand after placement if (EquipSystem.Instance.selectedItemModel != null) { Destroy(EquipSystem.Instance.selectedItemModel); EquipSystem.Instance.selectedItemModel = null; } itemToBePlaced = null; inPlacementMode = false; if (placementHintUI != null) placementHintUI.SetActive(false); }</pre>	<ul style="list-style-type: none"> • Finalizes the placement of a placeable item in the environment. It disables placement outlines, assigns a unique chest ID (if applicable), and removes the item's visual model from the player's hand. It also exits placement mode and hides the placement hint UI.

3.2.4 Testing Phase

Testing is an important part of making sure the game works properly. In this phase, the game is checked for bugs, performance issues, and user experience problems. Usually, fixing bugs using visual studio code for faster process of checking bug. Jom Berkhemah had outside users test it to get feedback. Testers will be giving feedback like making sure the game's instructions were clear, the mechanics worked, and the educational content was met. Feedback from this phase helps improve the game in the next cycle.

Test	Expected Result	Actual Result	Corrective Action
Game launch	Game starts and main menu loads correctly.	Game successfully launched and menu displayed.	No needed.
Start button	Starts a new game session from main menu.	Game initializes with new environment and default values.	No needed.
Setting button	Setting button should be clicked to display the background and sound effect setting.	Setting successfully creates by clicking the button first to display volume slider which is sound effect and background music.	No needed.
Exit the game button	Exit button should handle the application to exit the game	Exit button handles the application to exit the game.	No needed.
'Sambung' Button	This button should handle the saved game of player.	This button already handles multiple saved game name.	No needed.
'Tambah Permainan' button	This button should handle a new game for new player	This button can handle a new game by clicking this button.	No needed.
Information button	Information button should show the user how to survive in the game.	This button handles the checklist of the game objective.	No needed.
Crafting system	Players can craft tools when resources are available.	Tools are crafted as expected based on resource input.	No needed.
Inventory management	Opens inventory and displays collected items.	Inventory UI opens; items displayed correctly.	No needed.
Quick slot (Equip System)	Quick slot should handle the tool and the placement thing like campfire, axe and more in the hand.	Quick slot successfully handles the equippable item.	No needed.
Cooking system	Cooking should be visualized in 3D, so players know what they are cooking.	Change the cooking visual in 2D but it is still interactive to player to cook the food or drink.	No needed.
Health tracking	Health bar decreases with injuries or hunger	Health indicator decreases accordingly	No needed.
Hunger and energy tracking	Hunger and energy bars change based on time and activity.	Both bars behave as expected during gameplay.	No needed.
Load Saved game	Loads previously saved game state.	Successfully loaded player state and environment.	No needed.
Save progress button	Game paused and resumed with no issues.	Inventory, and time counter are saved correctly.	Need to readjust the placement position of terrain-like chest, campfire and more.
Placement system	Players can place the items that were equipped in the quick slot to be placed in the terrain.	The placement slightly slips out the map (terrain), but it is still working as expected.	Need to readjust the item to be snapped to the terrain.

3.2.5 Beta Phase

In the beta phase, the game is shared with a small group of people to test it in real world conditions. This phase helps to understand how players will experience the game and identify any final problems. For Jom Berkhemah, beta testers included students from the target audience, which are Sekolah Menengah Kebangsaan Desa Cemerlang, Ulu Tiram, Johor. Their feedback helped to refine again the game and make sure it was engaging and easy to understand.

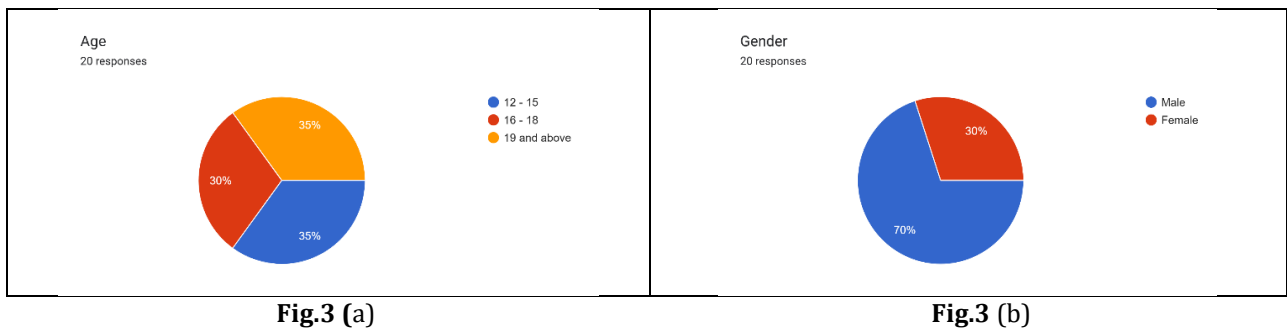
3.2.6 Release Phase

The final phase is the release phase, where the game is launched for everyone to use. Once all feedback is implemented to the game, the game will be stable. In this phase, the game is finalized and uploaded to its platform, such as desktops platform. Jom Berkhemah game also included preparing instructions, promotional materials, and user guides to make it easier for players to start the game. This phase ensures the game is ready for the public and meets its requirements.

4. Result and Discussion

In this section, the testing phase of Jom Berkhemah game will be discussed in further detail. In this project development, alpha and beta testing were conducted to make sure of all the functionality and usability. The testers were asked to fill in an online questionnaire through Google Forms. The questionnaire consists of 10 questions that focus on the usability of the application by using the System Usability Scale (SUS) [12] to test user acceptance level.

Figure 3(a) and Figure 3(b) show are Gender of users and Age of users. In the beta testing, a total of 20 testers took part. The 20 respondents are 14 males (70%) and 6 females (30%) as shown in Figure 3(a). On the other hand, there are 7 (35%) respondents who are 12-15 years old and 7 (35%) 16-18 years old respectively. The rest (30%) respondents are 6. Figure 3 shows the chart of all respondents answering the question and Figure 4 and 5 shows that System Usable Scale result chart even and odd result. Lastly, Table 13 is a System Usable Scale (SUS) with average score after calculating odd and even scores.



The overall result of SUS questions shows that over half of respondents do not have much problem using Jom Berkhemah game application. The total scores for each question from the user tests are shown in Table 11 and Table 12 in total of 20 respondent in detail, followed by calculating the average score by using the SUS formula. Also, Table 11 is questionnaire sorting by odd numbers and Table 12 is questionnaire sorting by even numbers.

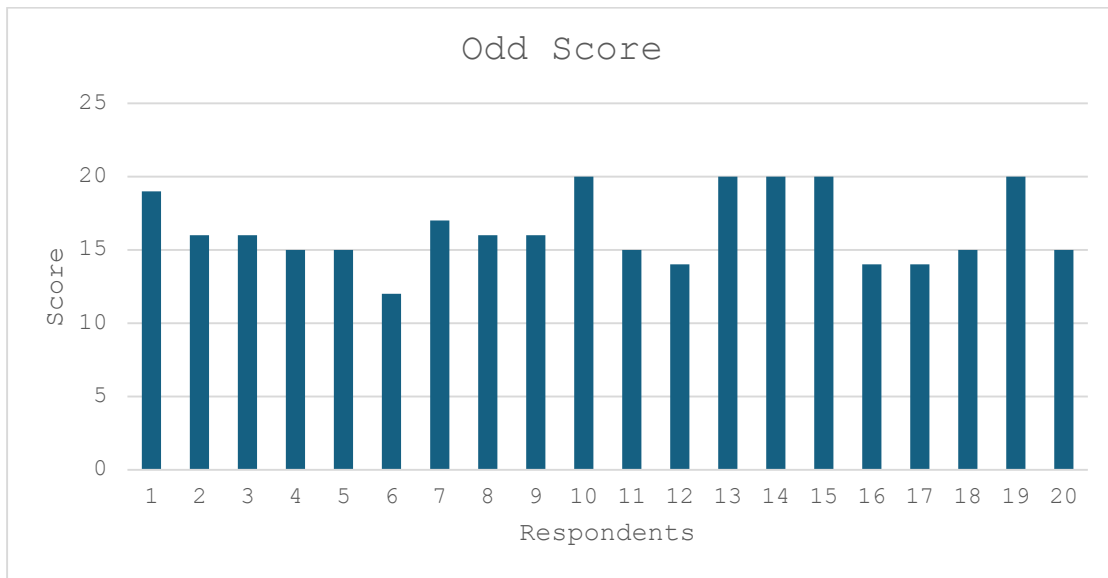


Fig. 4 Odd Score User Acceptance Test

Table 11 Questionnaire Question (Even Number)

Question 1: I think that I would like to use this application frequently
Question 3: I thought the application was easy to use
Question 5: I found thevarious functions in this application were well integrated
Question 7: I would imagine that most people would learn to use this application very quickly
Question 9: I felt very confident using this application

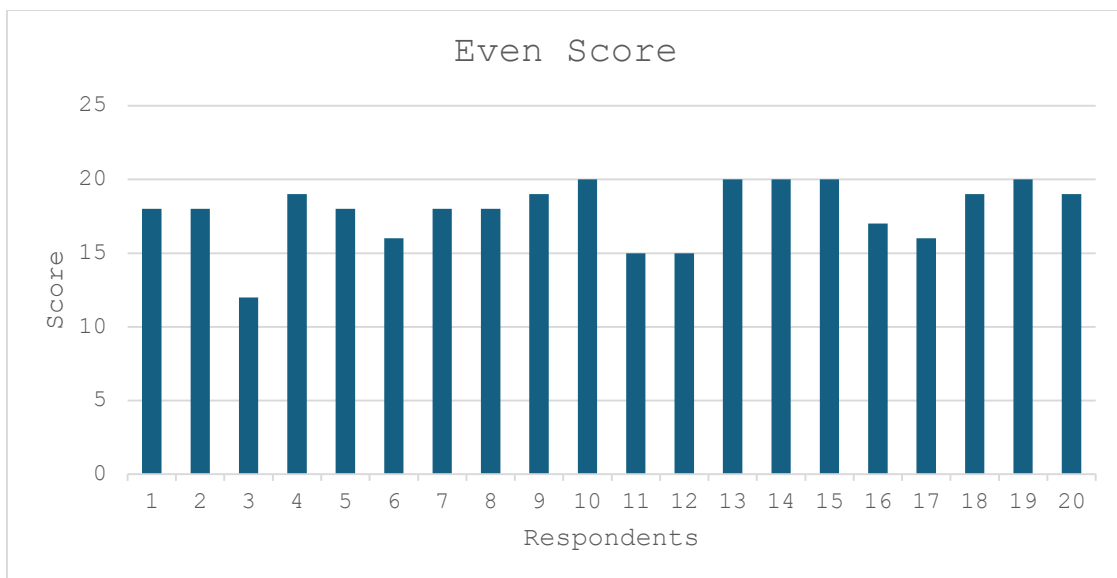


Fig. 5 Even Score User Acceptance Test

Table 12 Questionnaire Question (Even Number)

Question 2: I found the application unnecessarily complex
Question 4: I think that I would need the support of a technical person to be able to use this application
Question 6: I thought there was too much inconsistency in this application
Question 8: I found the application very cumbersome to use
Question 10: I needed to learn a lot of things before I could get going with this application

Table 13 Respondents' Score

Respondent	Item Score										Odd Score	Even Score	Total Score	
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10				
R01	5	2	5	1	4	1	5	1	5	2	19	18	92.5	
R02	4	1	4	2	5	1	4	1	4	2	16	18	85	
R03	4	2	4	2	5	2	4	2	4	5	16	12	70	
R04	4	1	4	1	5	1	3	1	4	2	15	19	85	
R05	4	1	5	2	4	1	3	1	4	2	15	18	82.5	
R06	3	1	3	5	4	1	4	1	3	1	12	16	70	
R07	4	1	4	1	5	2	4	1	5	2	17	18	87.5	
R08	3	1	5	1	4	2	5	1	4	2	16	18	85	
R09	4	1	4	2	5	1	4	1	4	1	16	19	87.5	
R10	5	1	5	1	5	1	5	1	5	1	20	20	100	
R11	1	2	5	2	5	2	5	2	4	2	15	15	75	
R12	3	1	4	2	4	1	4	1	4	5	14	15	72.5	
R13	5	1	5	1	5	1	5	1	5	1	20	20	100	
R14	5	1	5	1	5	1	5	1	5	1	20	20	100	
R15	5	1	5	1	5	1	5	1	5	1	20	20	100	
R16	3	2	4	2	4	1	4	1	4	2	14	17	77.5	
R17	4	2	5	2	3	2	3	1	4	2	14	16	75	
R18	4	1	3	1	4	2	5	1	4	1	15	19	85	
R19	5	1	5	1	5	1	5	1	5	1	20	20	100	
R20	4	2	4	1	4	1	3	1	5	1	15	19	85	
Average Score												85.75		

The formula used to calculate the results based on the SUS is: Total score = (odd items + even items) x 2.5

Average score = Total score / Total Respondents

Where: Odd Items (Q1, Q3, Q5, Q7, Q9) = Contribution - 5

Even Items (Q2, Q4, Q6, Q8, Q10) = Contribution - 1

Therefore, average score = (92.5 + 85 + 70 + 85 + 82.5 + 70 + 87.5 + 85 + 87.5 + 100 + 75 + 72.5 + 100 + 100 + 100 + 77.5 + 75 + 85 + 100 + 85) / 20 = 85.75

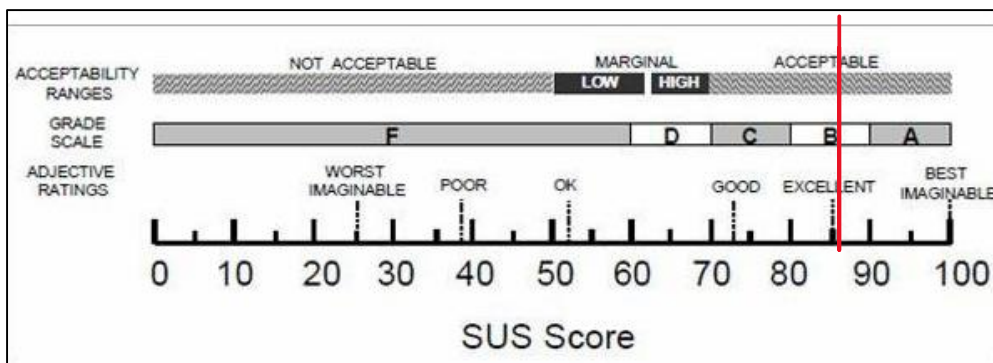


Fig. 6 System Usability Scale (SUS)

The total scores for each question from the testers were obtained by calculating the average score by using the formula based on the System Usability Scale (SUS). The average score is 85.75 which is within the range of "acceptable" in the Acceptability Range score scale. The Grade Scale is "B", and the Adjective Rating is "Excellent" as shown in Figure 6.

5. Conclusion

In summary, "Jom Berkhemah: A 3D Desktop Game" has shown strong potential in achieving its main goals teaching players about basic survival skills through an engaging and interactive experience. By placing players in a simulated camping environment, the game allows them to practice real-life activities such as crafting, gathering resources, and managing personal health in a way that feels hands-on and practical.

One of the biggest strengths of the game is its ability to turn learning into a fun and immersive journey. Players are not just told what to do, they are encouraged to explore and figure things out on their own, which helps build independence and better understanding. The visuals and sound design help create an enjoyable atmosphere, while features like crafting, inventory, and placement systems add depth to the gameplay. The fact that the game can be played offline is a nice bonus, especially for users in areas with limited internet access.

That said, there are still areas for improvement. Some gameplay elements like how objects are placed or how the fishing interaction works can feel a little clunky at times. Adding features such as more survival challenges, a skill progression system, or even environmental changes like weather could make the experience more dynamic and rewarding.

To sum up, "Jom Berkhemah" does a great job of blending education with entertainment. It offers a solid foundation for learning survival basics in a way that's enjoyable and memorable. With a few updates and new features, the game could reach an even wider audience and become a more complete tool for interactive learning in outdoor and survival education.

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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 Ikmal, Mohd Farhan Md. Fudzee; **data collection:** Muhammad Ikmal Ahmad, Mohd Farhan Md. Fudzee; **analysis and interpretation of results:** Muhammad Ikmal Ahmad, Mohd Farhan Md. Fudzee; draft manuscript preparation: Muhammad Ikmal Ahmad, Mohd Farhan Md. Fudzee. All authors reviewed the results and approved the final version of the manuscript.

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Appendix A: System Flowchart

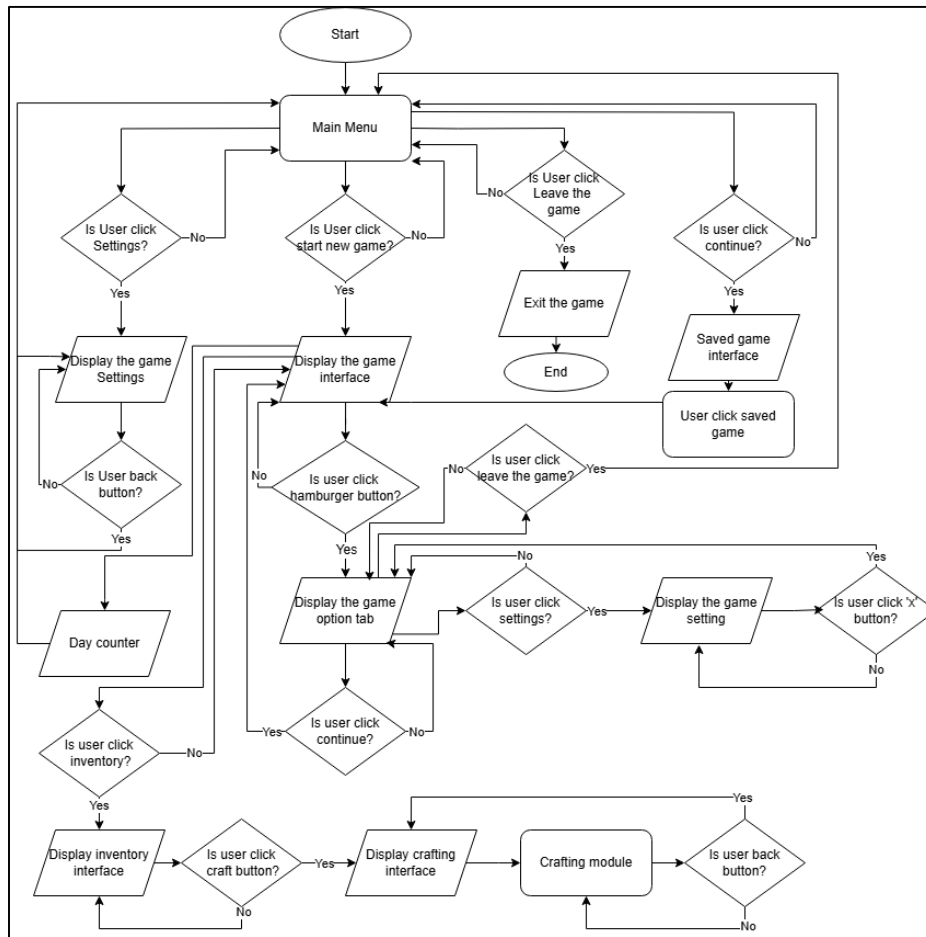


Fig. 7 System Flowchart

Appendix B: Application Module Diagram (Navigation Structure)

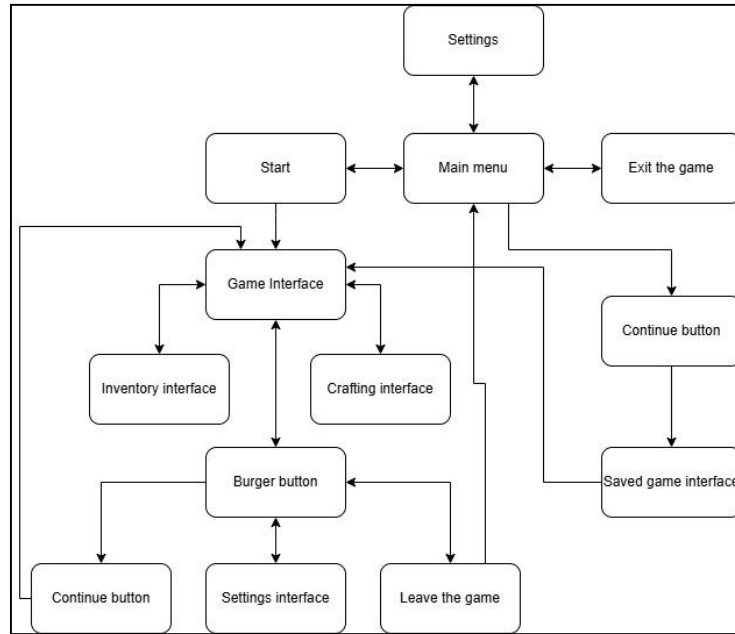


Fig. 8 Navigation Structure

Appendix C: User Acceptance Test

This section shows the result of the question from System Usable Scale (SUS) form for user analysis

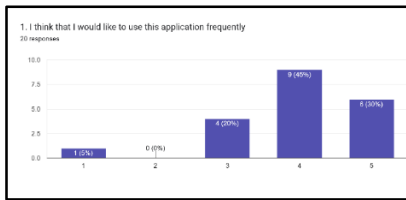


Fig.9 (a)

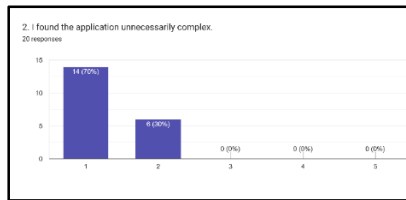


Fig.9 (b)

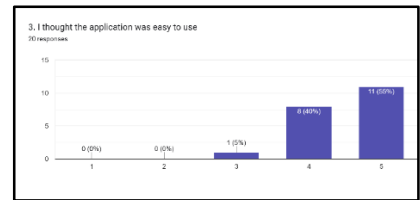


Fig.9 (c)

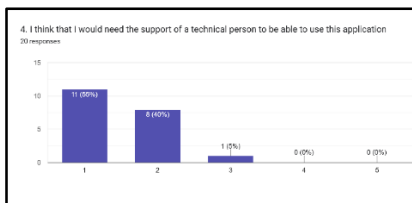


Fig.9 (d)

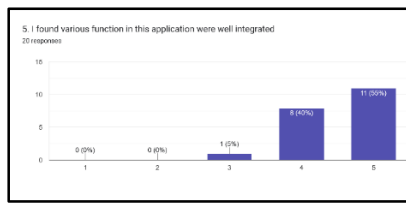


Fig.9 (e)

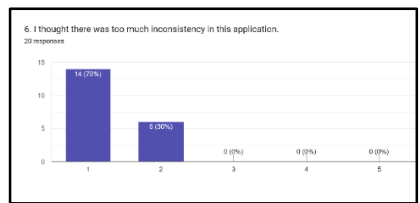


Fig.9 (f)

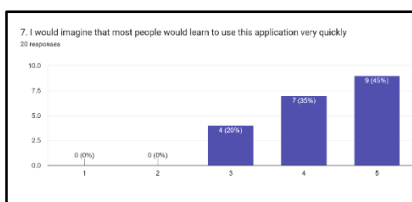


Fig.9 (g)

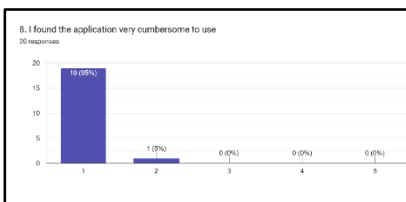


Fig.9 (h)

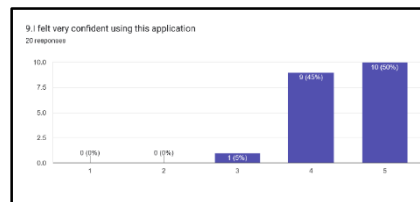


Fig.9(i)

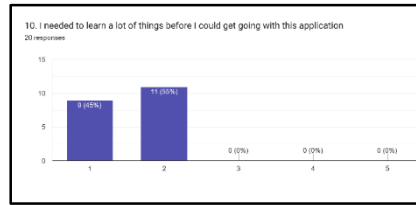


Fig.9 (j)