

A virtual reality game of Khalid Ibn Al-Walid short story in first person perspective

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Abstract. Islam is a religion that is adhered to by 24.1 percent of the world's population in 2015. The accelerated and extensive spread of Islam is inseparable from the efforts of former world Islamic figures. Islamic history designates a hero who was famous for his courage and intelligence, Khalid ibn Al-Walid. He was a fellow of the Prophet, who was very skilled in the military field. The history of his dispute writes in many history books, studies, and documentaries. This study proposes a game using virtual reality device as an alternative mechanism for the introduction to Khalid ibn Al-Walid. A brief history of the characters arranged in an ordered narrative story, then prepared in the form of a first-person shooter game. Interaction in the game uses a virtual reality device to simulate the operation and action of the character. After playing, 37 checklist point about the character stories gave to 10 players. The average success of exact answers is 71.35 percent.

1. Introduction

Islam is one of the most numerous religions adopted in the world. Research in 2015 shows that 24.1% of the world's population are Muslims and predicted to be fastest-growing major religious group. Indonesia has the most prominent Muslim community in the world, with above 227 million people recognizing as Muslim. However, the knowledge of the Islamic religious insight in Indonesia is still shallow, including knowledge about Sirah or stories of Sahabi's. Sahabi is the companion of Prophet Muhammad, and the stories of these Sahabis are essential for Muslims, especially Muslim youths, to take an example of their commendable behaviour.

One of the best Sahabi is Khalid ibn Al-Walid, the Prophet armies leader. He was a fellow of the Prophet, who was very skilled in the military field, as he knew by his courage, perseverance, intelligence, and toughness in the war [1]. His biography writes in many books [2, 3], studies, and applications. The rapid growth of technology makes it easier for humans to get knowledge without being hindered by distance and place. Learning techniques accommodate utilizing digital gaming tools besides conventional [4, 5]. This research proposes a virtual reality game as an alternative method for the introduction of Khalid ibn Al-Walid. A brief history of the characters arranged in an ordered narrative story, then developed in the form of a first-person shooter game. Interaction in the game utilizes a virtual reality device to simulate the action and movement of the character.



2. Related works

There are some researches related to supporting the fundamental theory of virtual reality game of Khalid ibn Al-Walid short story development. Nyimas [6] developed a mobile-based strategy game for learning history of Utsman Bin Affan, one of the Sahabi of the Prophet, who was known to be humble but very hospitable. David Fahmi Abdillah [7] developed First person shooter VR based game on 10 november 1945 with motion controller for learning history of the struggle of the Indonesian people against the occupation that took place in Surabaya on November 10, 1945, which is celebrated as Heroes' Day. Kholid [8] developed a K-Nearest Neighbor based puzzle game for learning the human body, which can be used as a support for biology subjects for students at school. According to Tamayo *et al.* [9] research, several scientific studies and educations have used virtual reality and immersive environments as a supporting method. Creating immersive environments and interactions require a method and approach new system, thus producing a new form of rendering information and improve player interaction with the virtual environment. Basuki *et al.* [10] propose an interactive promotional tool by utilizing technological advancements in the form of a virtual tour 3D application. This virtual 3D virtual application tour Android-based Jago Temple historical site provides information about Jago Temple and displays historical views of Jago Temple attractions in 3D virtual form. The user seems to be able to explore the environment of the Jago Temple historical site in real life.

3. System design

As described in Figure 1, the system develops using a Virtual Reality device as a medium of interaction in a virtual environment. The player will be in a virtual environment as Khalid ibn Al-Walid figure. Player interactions, such as movement and action, captured by Motion Controller and Tracking devices. These devices will detect the movement of the player in the real world, turning it into a value that will be processed by the system.

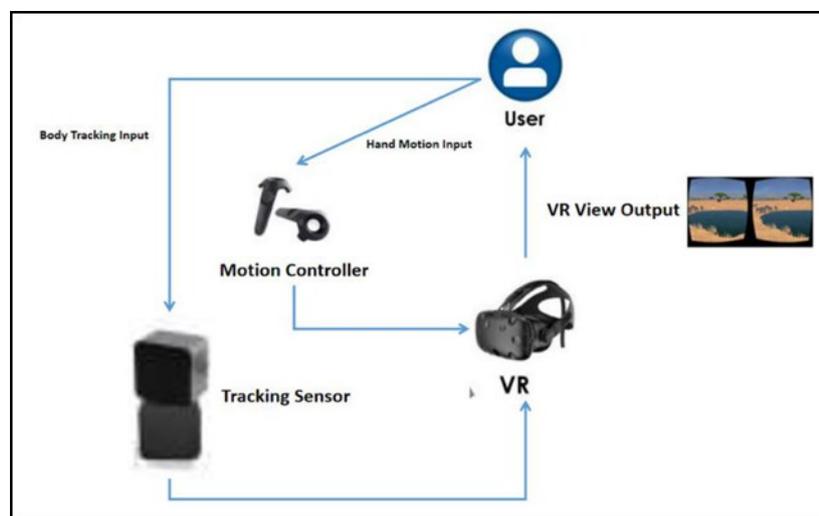


Figure 1. System design.

3.1. Game system elements

Elements of a game system have four elements; player, controller devices, head-mounted equipment, and gameplay.

3.1.1. Player. The player is the preeminent participant that will play the game. The player will provide input to the game as well will receive visual output provided from a Virtual Reality device.

3.1.2. Controller devices. These devices will capture the player's movements and actions, then convert into values that will be processed by the system.

3.1.3. *Head-mounted virtual reality device.* The head-mounted equipment will process data received from the controllers. The later device will display characters within the virtual environment in 3D.

3.1.4. *Ordered narrative story of gameplay.* The game has a story of Khalid ibn Al-Walid's battle, using an ordered narrative consisting of 5 parts; exposition, rising action, climax, falling action, and resolution. As described in figure 2, the game has ten chapters to accomplish.

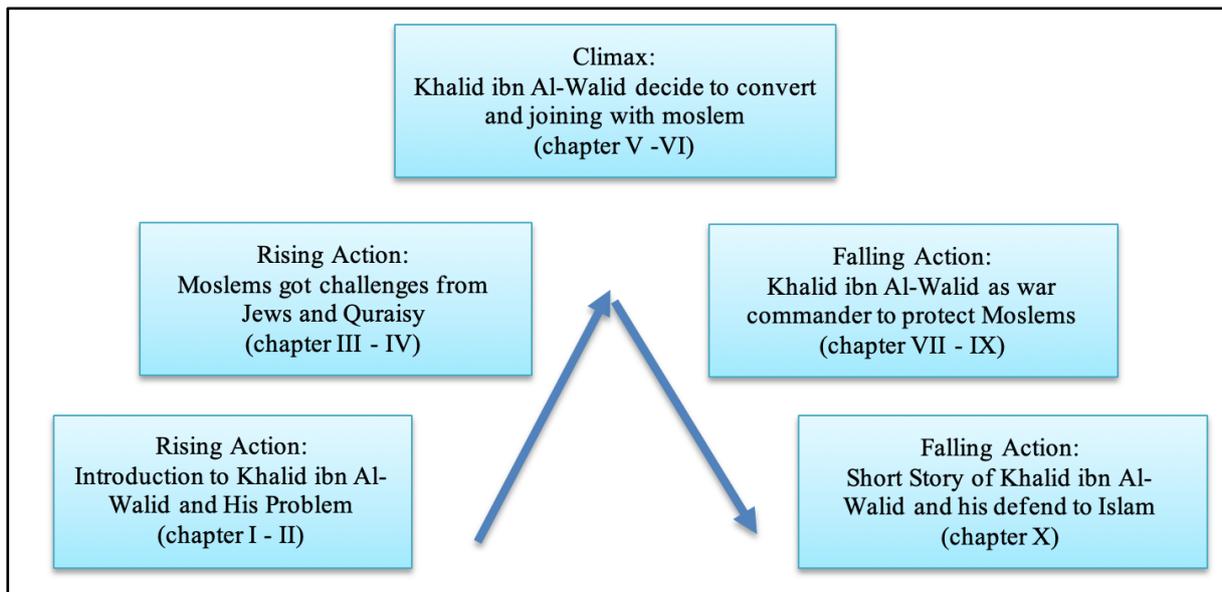


Figure 2. Ordered narrative story of Khalid Ibn Al-Walid.

3.2. *Hardware and software design*

Figure 3 depicts how the relationship that occurs between the software/game with the player. The game will get input from controller devices. Game audios and graphics will visualize, and display at Head-Mounted device.

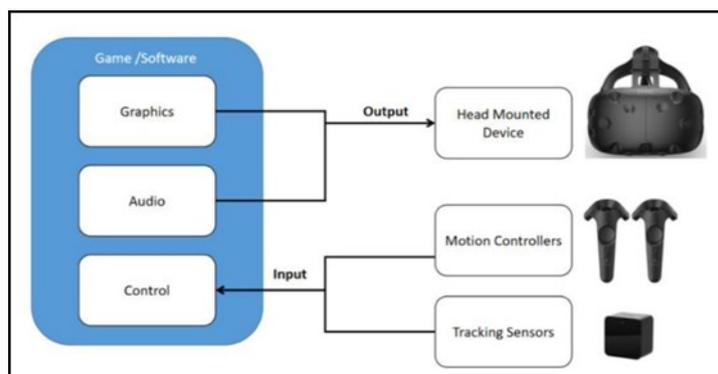


Figure 3. Hardware and software design.

3.3. *Controller devices and head-mounted integration within the game*

Unreal has some features and capabilities to support the game developers implement Virtual Reality device control function. Unreal has provided the keymap of input found on the Virtual Reality device from the button trigger to motion control.

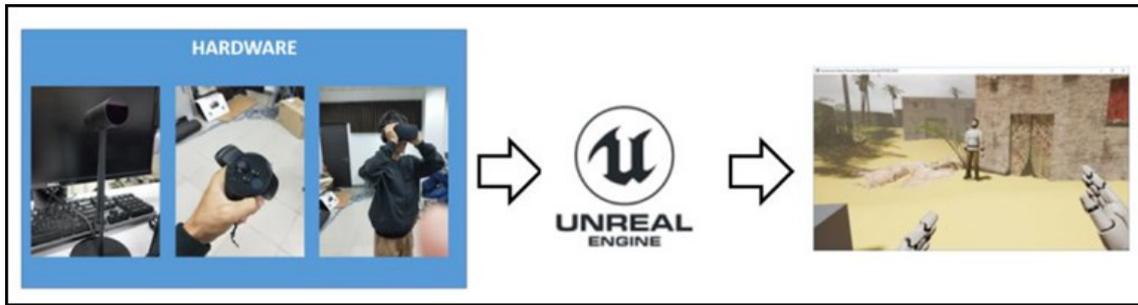


Figure 4. Integration between hardware and software.

Figure 4 shows three devices to obtain the input value; a pair of motion-controller, motion sensor, and HMD. Each device sends data processed by the engine. The result then displayed as audio and visual. From all the components and processes above, we get the final results of game gameplay and interactions performed by the player on the Virtual Reality device of the game. Figure 5 is an example of the resulting process.



Figure 5. Resulting process.

4. Results

4.1. Movement gesture result

Initial conditions scenario where the player enters the Virtual Reality environment later is in an initial position in the world of Virtual Reality. The player should do some fake walks with hands waving like walking, as seen in Figure 7. This action will make character moves in the virtual world. Figure 6 shows the moving gesture result.

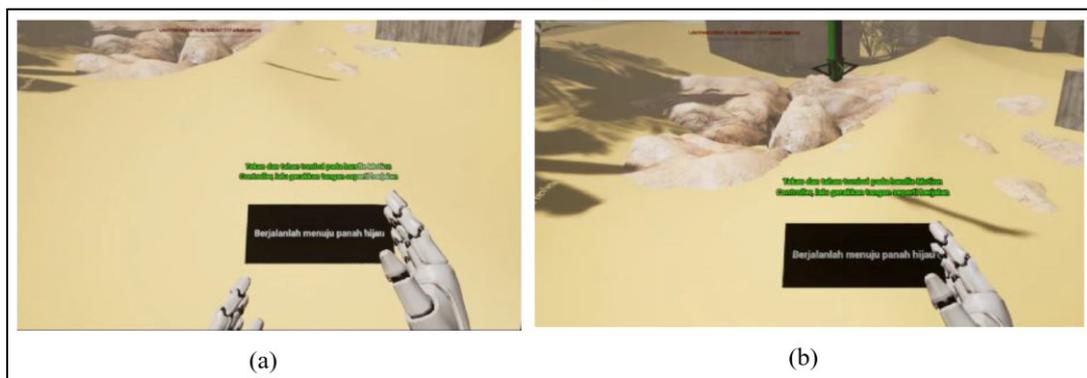


Figure 6. (a) Before gesture movement (b) After gesture movement.



Figure 7. Example of gesture movement of player.

4.2. Grab object result

An interactable object is a virtual object that can be grabbed by character. This object prepared before grab object testing launched. To accomplish the objective, the player draws his hand to the virtual world by moving his hands in the real world holding the motion controller, as shown in Figure 9.

If the distance between hand and object in an acceptable range, the player should press and hold the button at the controller. We can see in Figure 8 is a condition when the Grab Object function successfully performed, then the object will stick to the player's hand

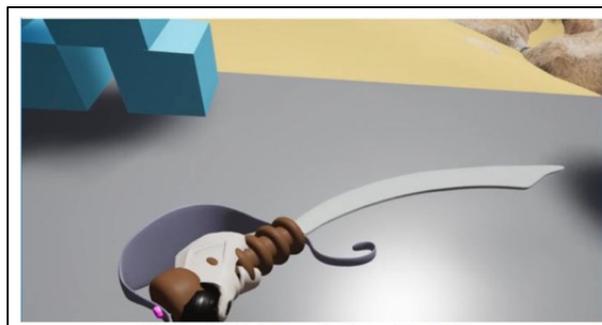


Figure 8. Grabbing object at virtual environment.



Figure 9. Example of grabbing object of player.

4.3. Narratives gameplay result

Ten players have to mark thirty-seven checklist point about narration shortly after completing the game. It aims to measure the level of success of the narrative gameplay reaching the goal. Successful rates calculated with a simple Equation (1).

$$\text{Successful Rate (\%)} = \frac{\text{Total Checked Points}}{\text{All Points}} \times 100\% \quad (1)$$

Table 1. Result of ten players.

Sample No	Checklist Checked points	Successful Rates (%)
1	12	32
2	28	76
3	20	54
4	30	81
5	35	95
6	29	78
7	21	57
8	25	68
9	27	73
10	37	100

Table 1 shows the average result narrative gameplay successful rate is 71.35%, the lowest rate is 32.4%, and the highest one is 100%.

5. Conclusions

This study proposes a game using virtual reality device as an alternative mechanism for the introduction to Khalid ibn Al-Walid. A brief history of the characters arranged in an ordered narrative story, then prepared in the form of a first-person shooter game. Interaction in the game uses a virtual reality device to simulate the operation and action of the character. After playing, 37 checklist point about the character stories gave to 10 players. The average success of exact answers is 71.35%.

6. References

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