



SIMULATION OF TRAIN TICKET BOOKING PROCEDURES AT XYZ TRAIN STATION BASED ON 3D ANIMATION WITH THE POSE TO POSE METHOD

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ABSTRACT

The development of the world of technology today has almost touched all aspects of human life from the agricultural, health, academic, trade and transportation sectors. Rail transportation is one of the land transportation that plays an important role for the development of all sectors in Indonesia. However, so far there are still many people who do not understand the procedure for ordering train tickets, so the author makes a simulation education of train ticket ordering procedures that can be accessed by the general public. To realize this, it can be done by utilizing multimedia facilities based on 3-dimensional (3D) animation. The selection of multimedia facilities based on 3D Animation is also an innovation in conveying information digitally. This animation provides a detailed and structured explanation of the procedure for booking train tickets at XYZ station. This animation is made in the form of video, has an explanation in the form of text and sound. Transition effects along with background music sync are also added to make the Animations more interesting. The results of the research conducted by the author can be seen based on the results of a video simulation trial of the 3D animation-based train ticket ordering procedure that the author made in the form of a questionnaire taken from twenty respondents. From the results of the questionnaire, 85% of respondents stated that it was "very helpful", 10% "helped", and 5% "enough" that this simulation video of the train ticket ordering procedure helps people who do not understand the procedure for ordering train tickets. In addition, 85% of respondents stated that they were "very able" and 15% said "can" that 3D animation can be used in delivering education, especially education on simulation of train ticket ordering procedures that can be accessed by the general public.

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1. INTRODUCTION

The development of the world of technology today has almost touched all aspects of human life from the agricultural, health, academic, trade and transportation sectors. Rail transportation is one of the land transportation that plays an important role for the development of all sectors in Indonesia. The development of the railway industry in Indonesia is expected to be a top priority for PT. Railway Industry in Indonesia. As one of the companies engaged in the transportation of passenger transportation services, PT. Kereta Api Indonesia

(Persero) continues to innovate accompanied by technological developments for the purpose of meeting the expectations of its customers. One of them is the development of convenience services in buying tickets. The increasing importance of service to service users in the field of ticket reservations, internet-based applications are felt to be very important to answer these problems. WAP (Wireless Application Protocol) is a technology that can turn a cell phone and PDA into an internet access tool, so that to order train tickets users can easily use cellphones and PDAs because in addition to being easy to carry and using a wireless network, devices mobile phones that have WAP facilities can access the Internet [1].

The simulation method is used to simulate real events and also the proposed breeding is given. Simulation method is also given to make an improvement of the train ticket purchasing service system. In its development the purchase of train tickets does not have to come to the station, purchases can be made online. However, online purchases are only for business and executive train ticket types [2]. However, there are still many people who do not understand the procedure for ordering train tickets. To overcome these problems, the author makes a simulation education of train ticket ordering procedures as learning that can be accessed by the general public. To realize this, it can be done by utilizing multimedia facilities based on 3-dimensional (3D) animation by holding the pose to pose method.

The selection of multimedia facilities based on 3D Animation is also an innovation in conveying information digitally. Multimedia is the use of computers to create and combine text, graphics, audio, moving images (video and animation) by combining links and tools that allow users to navigate, interact, create and communicate [3]. This animation provides a detailed and structured explanation of the procedure for ordering train tickets at the Medan station. This animation is made in the form of video, has an explanation in the form of text and sound. Transition effects along with background music sync are also added to make the Animations more interesting. Animation is a technique for displaying images sequentially so that there is an illustration of the movement or motion of the displayed image [4]. 3D animation is animation in 3D. Although not in actual 3D form, which is not a 3D object that can be touched and felt its physical form, but in 3D form on a 2D glass screen (TV screen media, cinema, computers, projectors, and similar media) [5].

To be able to create 3D animation, a software is needed, one of which is 3D Blender. Blender is an open source 3D creation tool. Blender supports all 3D workflows such as modeling, rigging, animation, simulation, rendering, compositing and motion tracking, even video editing and game creation. Blender is very suitable for use by individuals as well as by small studios that are useful in 3D projects [5]. To be able to produce good quality animation, an animator really needs to understand the basic principles and methods used in the animating process. One method that has long been known in the animating process is the pose to pose method. The pose to pose method is a method in which animation work starts from an animator planning the entire movement to be animated and then determining each keypose or key pose of each character movement [4].

1.1 Problem Formulation

Based on the explanation of the background above, the authors found the problems in this study, namely: How to make a simulation of the procedure for ordering train tickets based on 3D animation that is interesting and can be one of the educational media to find out the procedure for ordering train tickets for the general public? How is the application of the pose to pose method in making a simulation of the train ticket ordering procedure at the XYZ train station based on 3D animation? How is the effectiveness of using the pose to pose method in making a simulation of the train ticket ordering procedure at the XYZ train station based on 3D animation?

1.2 Purpose and Benefits

The objectives of this research are:

The aim is that the simulation of ordering train tickets based on 3D animation can be one of the educational media to find out the procedure for ordering train tickets for the general public. To take advantage of 3D Animation as an innovation in delivering education. To provide education regarding the procedure for ordering train tickets to the general public through 3D Animation-based videos.

2. RESEARCH METHOD

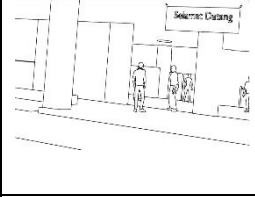
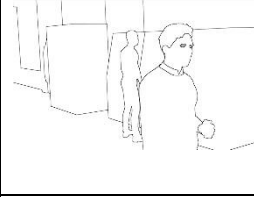

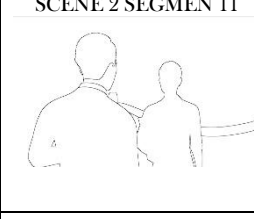
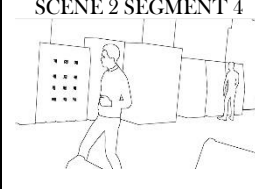
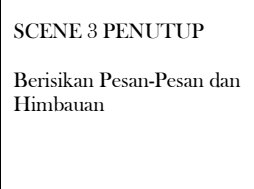
In the method or steps in the simulation of the train ticket ordering procedure at the XYZ train station based on 3D animation, there are three stages of manufacture, namely: Pre-Production Stage, Production Stage and Post-Production Stage.

2.1 Pre-Production Stage

The pre-production stage is the earliest stage in the animation-making process. At this stage all things related to the process of making animation works are prepared. In this stage, in making a simulation of the procedure for ordering train tickets based on 3D animation, there are several things that must be done, namely: collecting ticket booking information for the field, building character and place concept ideas, making storyboards according to ticket ordering information obtained. At this pre-production stage, ideas and storylines will be poured into a storyboard. Storyboard is a script that is poured in the form of drawings or sketches that are useful to make it easier for cameramen to take pictures [6].

Table 1. Storyboard Simulation of Train Ticket Booking Procedure at XYZ Station

No	Gambar Cerita	Keterangan
1.		Initial Scene: The first part of the animation contains the Title, Name, NPM, and the Logo of Universitas Harapan Medan Involves Audio Visual and Text.
2.		Scene 1 Segment 1: Contains an animation of a room where the demonstration actor will show instructions for ordering train tickets online. Involves Audio Visual.
3.		Scene 1 Segment 2: In the same scene "A", the camera slowly approaches the gadget and then the online train ticket booking instructions begin. Involves Audio Visual.
4.		Scene 1 Segment 3 & Sub Ordering: In the same scene "A", the gadget demonstrates how to order train tickets online "each sub" accompanied by a dialogue. Involves Audio Visual and Text.
5.		Scene 2 Segment 1: At the beginning of scene B is the animation of the building in front of the Medan train station "Front Viewport" which will slowly lead to the character as a demonstration of ordering train tickets directly at the Medan train station. Involves Audio Visual.
6.		Scene 2 Segment 2: In the same scene "B" character performs a health check.
9.		Scene 2 Segmen 5: Pada scene yang sama "B" mensimulasikan proses menuju loket. Melibatkan Audio Visual.
10.		Scene 2 Segmen 6: Pada scene yang sama "B" mensimulasikan proses antrean dan instruksi tunggu. Melibatkan Audio Visual dan Text.
11.		Scene 2 Segmen 7: Pada scene yang sama "B" berisikan pemberitahuan apabila antrean panjang "maka silahkan ambil bangku". Melibatkan Audio Visual dan Text.
12.		Scene 2 Segmen 8: Pada scene yang sama "B" mensimulasikan proses pemesanan tiket pada loket. Melibatkan Audio Visual dan Text.
13.		Scene 2 Segmen 9: Pada scene yang sama "B" berupa instruksi "mengarah ke pintu naik kereta dan temukan mesin check in counter apabila petugas memberikan struk berisikan kode booking, agar ditukarkan dengan tiket. Melibatkan Audio Visual dan Text.
14.		Scene 2 Segmen 10: Pada scene ini berupa lokasi mesin check in counter berada di sebelah kanan dan berbaris

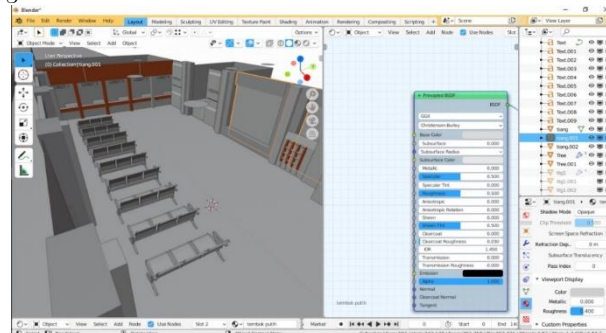
		Involves Audio Visual and Text.			berserta instruksi tambahan “apabila pemesanan tiket dilakukan secara <i>online</i> anda juga harus menukarkannya di mesin ini dengan melakukan <i>scan barcode</i> ”. Melibatkan <i>Audio Visual</i> dan <i>Text</i> .
7.	SCENE 2 SEGMENT 3 	Scene 2 Segment 3: In the same scene “B” shows the atmosphere inside the Medan train station building. Involves Audio Visual and Text.		15. SCENE 2 SEGMENT 11 	Scene 2 Segmen 11: Pada akhir <i>scene</i> ini berupa instruksi dimana pemesan harus menunjukkan tiket kepada petugas agar dapat naik ke kereta. Melibatkan <i>Audio Visual</i> dan <i>Text</i> .
8.	SCENE 2 SEGMENT 4 	Scene 2 Segment 4: In the same scene “B” shows the check-in ticket machines in the scenario. Involves Audio Visual and Text.		16. SCENE 3 PENUTUP Berisikan Pesan-Pesan dan Himbauan 	Scene 3 Penutup: Pada <i>scene</i> akhir berupa pesan-pesan keamanan dan himbauan. Melibatkan <i>Audio Visual</i> dan <i>Text</i> .

2.2 Production Stage

At this stage, the animation process begins. This process greatly affects the visuals and image quality of the final result. There are several processes that must be passed at this stage, including:

a. XYZ Train Station 3D Object Modeling and Texturing Coloring

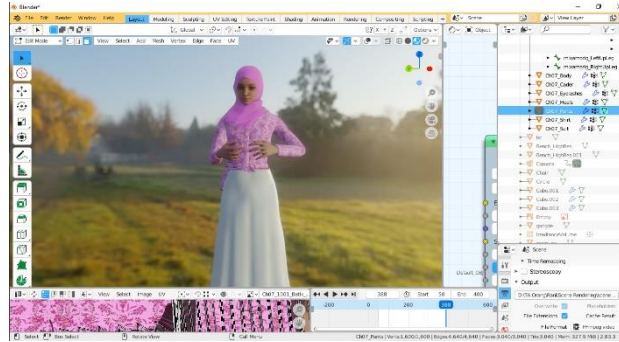
The process of drawing 3D objects from the XYZ train station involves the open source software Blender and is carried out one by one starting from the smallest part to the building by utilizing reference photos that have been collected. The process of making this station goes through two stages, namely the collection and formation of vertical points and texturing.



Picture 1. Texturing Process of XYZ . Train Building Interior

b. 3D Character Modeling and Texturing Coloring

The process of drawing the next object is a character, the process of depicting buildings and characters is carried out separately with the intention that memory usage is lower and more focused, while the stages of depicting these characters are no different from the stages of depicting the previous XYZ train station building.

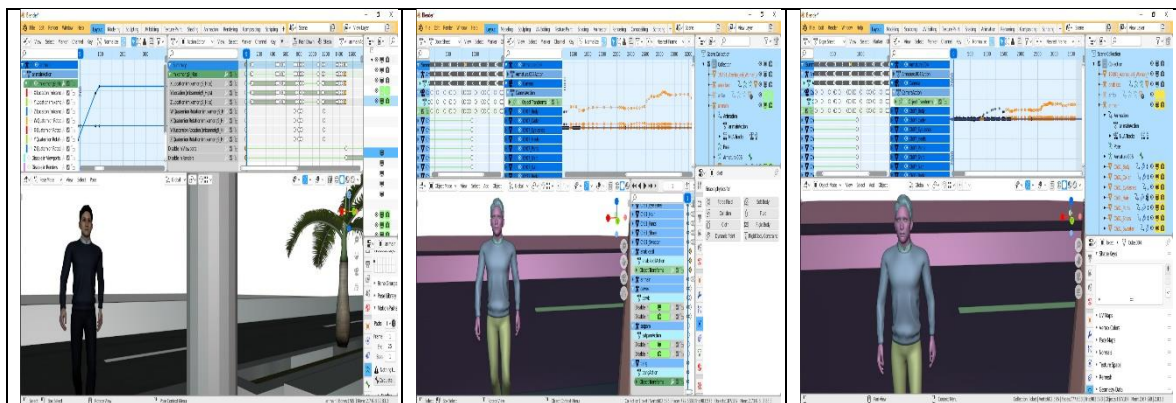


Picture 2. Completed Process

In picture 2, this process is the process of modeling and coloring the characters that have been completed and are in the process of making bones

c. Making the Pose To Pose Method of Motion

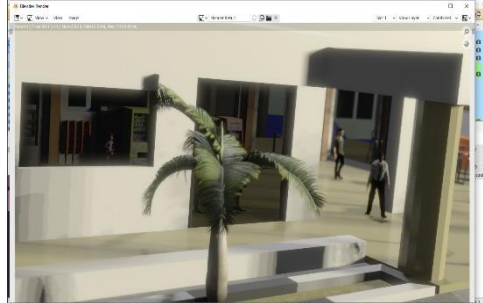
The pose to pose method is making animation by drawing only on important keyframes first, then in-between or intervals between keyframes are drawn [7]. The advantages of this method are relatively faster processing time, the resulting animation motion is more conceptual, errors found in setting poses can be corrected easily [5]. This stage of making motion or animation is still done in Blender. The pose to pose method is only performed on moving objects such as humans, animals or other objects such as car wheels and others. Animating with this method, although it is considered the most efficient for the general public, still feels complicated for beginners who still have to adapt to the terms insert key frame by location, rotation, and scale. The following is the process of making the pose to pose method motion shown in picture 3 below:



Picture 3. Showing the Pose To Pose Animation Process Stage 1, Stage 2 Pose To Pose Animation Process, Stage 3 Pose To Pose Animation Process

d. Rendering 3D Scene

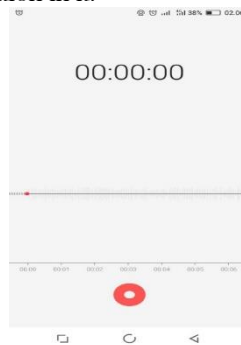
3D scene rendering is the process of converting data from 3D objects to image formats (eg JPG, BMP, GIF and others). Before this can be done, it is necessary to do 3D Modeling or the process of making the 3D model itself using certain software [8]. In this study the author uses the Blender application. This process is carried out before entering the final stage of production. It can be seen as in picture 4.



Picture 4. Scene Rendering Process

e. Audio Recording

The sound recording process is intended to clarify instructions which are not only in the form of text and images but also in the form of audio. This recording process only involves a series of tools such as a gadget in the form of an Android with a voice recorder application in it.



Picture 5. Android Voice Recorder Application

f. Mixing Video, Audio, and Text in Adobe After Effects

In this process where the unification of all elements is done both video, audio and text. This unification process involves Adobe After Effects software which will be re-rendered before entering the post-production stage, looks like in picture 6.



Picture 6. Merging Process in Adobe After Effects

g. Video Rendering

This video rendering stage is carried out in Adobe After Effects after everything is compiled, then the rendering process starts, the rendering process depends on the length of the video duration and the selected quality.



Picture 7. Rendering Process in Adobe After Effects

2.3 Post-Production Stage

The post-production stage is the final stage carried out after the production stage, usually this stage includes observing various segments, with the intent and purpose if the production results experience problems, instability, errors, or other problems, a decision is taken whether the production stage is revised again or continued. In this research, the post-production stage that the author does is only one thing, namely testing the effectiveness of the pose to pose method of motion.

a. Test the Effectiveness of the Pose To Pose Method

The next stage is testing the effectiveness of the pose to pose method used, whether the results of the pose to pose method used are very effective or not, the other is whether the motion will look natural or broken, usually testing does not use any tools, only doing a spectacle in the form of observing the results. production, these things will be outlined in the test of the effectiveness of the pose to pose method which can be seen in picture 8.



Picture 8. Observation Process on Post-Product

3. RESULTS AND DISCUSSION

3.1 Animation System Flowchart

Flowchart is a diagram that describes a flow and processes that occur in a system. Flowcharts are made to explain the stages of events that occur when a system is run. The following is a flowchart display of the animation system which can be seen in picture 9.

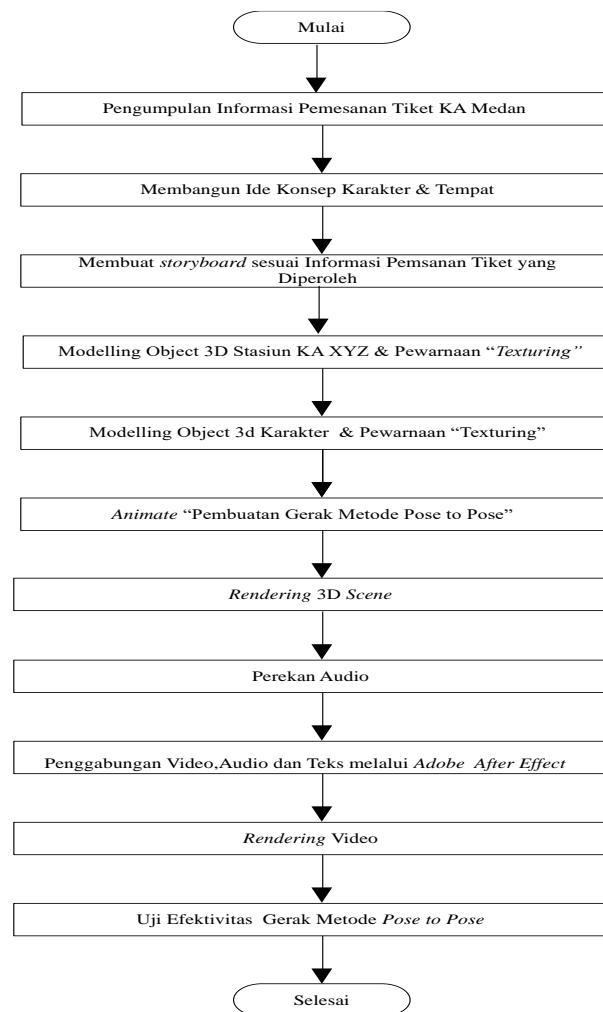
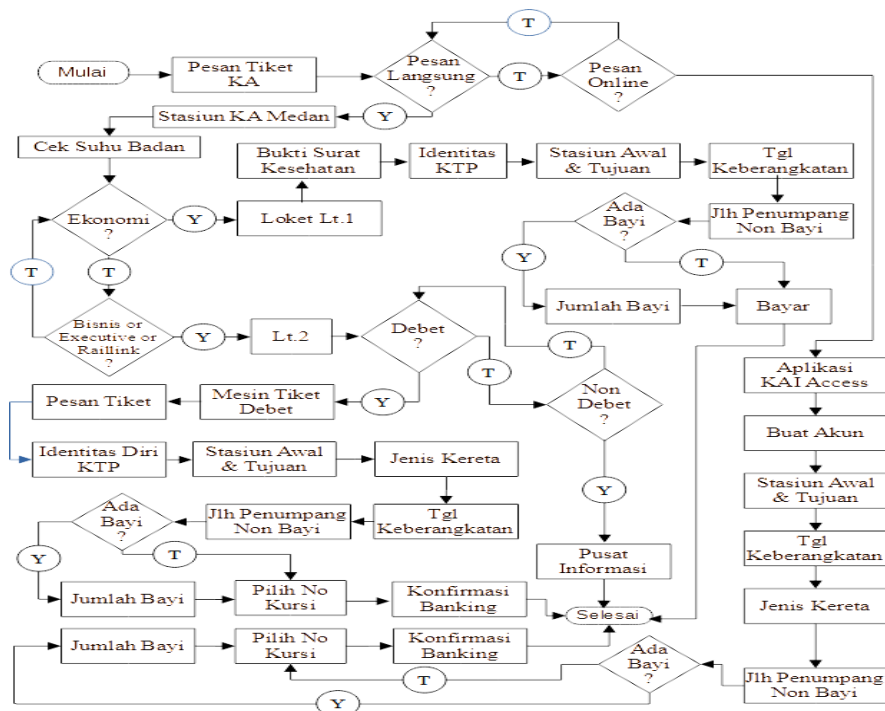


Figure 9. Animation System Flowchart

3.2 Train Ticket Booking Flowchart at XYZ . Station



Picture 10 : Train Ticket Booking Flowchart at XYZ . Station

3.3 Capture Window or Printscreen

a. Intro Part Intro

The opening part of the video is the initial view of the video which contains the title, name, npm and logo of Universitas Harapan Medan. The opening view of this video has a duration of 16 seconds, it can be seen in picture 10.



Picture 10. Intro Part Intro

b. Video Contents Section

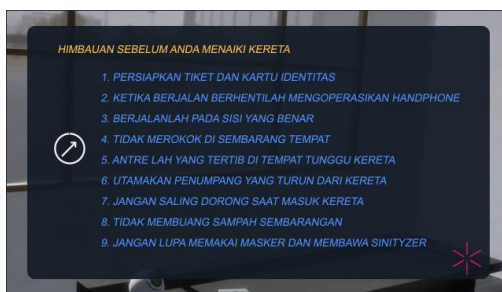
In the video content section, it explains the processes or stages of ordering train tickets online and directly at the XYZ train station. The initial segment is in the form of an initial scenario scheme that contains a room containing gadgets to start the online ticket ordering process. can be seen in Figure 11.



Picture11. The room where the initial online ticket booking scheme takes place

c. Cover Part

In the closing section (Picture 12) the author conveys a message of safety or order when traveling outside or on the train, this is intended so that passengers do not forget the most important things that must be present and carried during the trip and also do not interfere with comfort other passengers.



Picture 12. Closing Message

3.4 Testing with Blackbox Texting

At this stage the authors enter the animation that has been produced into a testing method by utilizing the blackbox testing method in order to obtain details of the existing procedures and determine whether or not they are in accordance with the actual procedure. Black-box method is a program testing based on the function of the program. The purpose of this Black-box testing method is to find malfunctions in the program [9]. Black-Box testing was conducted to find errors in several categories, namely: (1) missing or incorrect functions; (2) Errors in interface or display design; (3) Errors in data structure or external database access; (4) Performance errors; and (5) Initialization and termination errors [10]. Following are the observations:

Table 2. Testing the Online Train Ticket Booking System on Animation

No.	Examination Scenario	Test Case	Expected results	Test result	Conclusion
1.	Playing produced videos and matching them with actual procedures	KAI Access Download	Application download via google playstore	Corresponding	Valid
2.	Playing produced videos and matching them with actual procedures	Registration	Application for registration on KAI Access	According to the KAI Access application	Valid
3.	Playing produced videos and matching them with actual procedures	Choice of local or inter-city trains	There is a way to determine the choice of car	According to the KAI Access application	Valid
4.	Playing produced videos and matching them with actual procedures	Determination of origin station and destination station stasium	There is a way to determine the starting and destination stations	According to the KAI Access application	Valid
5.	Playing produced videos and matching them with actual procedures	Fill in departure date	There is a way to fill in the departure date	According to the KAI Access application	Valid
6.	Playing produced videos and matching them with actual procedures	Round trip button	There is an explanation of the return button	According to the KAI Access application	Valid
7.	Playing produced videos and matching them with actual procedures	Choice of train class	There is a way to choose classes between trains	According to the KAI Access application	Valid
8.	Playing produced videos and matching them with actual procedures	Total passenger	There is a way to fill in the number of passengers and babies	According to the KAI Access application	Valid

9.	Playing produced videos and matching them with actual procedures	Choice of train prices	There is a choice of trains with prices on animation	According to the KAI Access application	Valid
10.	Playing produced videos and matching them with actual procedures	Book someone else's ticket	There is a way to order tickets for third parties from our account	According to the KAI Access application	Valid
11.	Playing produced videos and matching them with actual procedures	Choose a passenger seat	There is a way to choose a passenger seat	According to the KAI Access application	Valid
12.	Playing produced videos and matching them with actual procedures	Bike sub luggage	There is an explanation of the bicycle baggage	According to the KAI Access application	Valid
13.	Playing produced videos and matching them with actual procedures	Checklist approval	There is information on the location of the approval checklist before payment	According to the KAI Access application	Valid
14.	Playing produced videos and matching them with actual procedures	Mobile banking payment	There is a method of payment via mobile banking	-	Invalid "Outside of KAI Access application"
15.	Playing produced videos and matching them with actual procedures	Reply from KAI Access	There is a notification regarding the reply from KAI Access to the email address	According to the KAI Access application	Valid

Table. 3 Testing the Offline Train Ticket Booking System on Animation

No	Examination Scenario	Test Case	Expected results	Test result	Conclusion
1.	Playing produced videos and matching them with actual procedures	Station building	The actual condition and form	As close as possible to the real	-
2.	Playing produced videos and matching them with actual procedures	Check body temperature	There is a body temperature check in the animation	There is	Valid
3.	Playing produced videos and matching them with actual procedures	1st Floor Counter Position	There are instructions to the counter location	According to Medan train station stasiun	Valid
4.	Playing produced videos and matching them with actual procedures	Queue instructions	There are queue instructions	According to the regulations of the XYZ train station	Valid
5.	Playing produced videos and matching them with actual procedures	Counter clerk's question	There is a leaked counter clerk's question	According to XYZ railway station regulations	Valid
6.	Playing produced videos and matching them with actual procedures	Check-in ticket machine location	There is a notification about the location of the check-in ticket machine	According to the actual location on the XYZ train station	Valid
7.	Playing produced videos and matching them with actual procedures	Location of the train entrance	There is information on the location of the train entrance	According to the actual location on the XYZ train station	Valid

3.5 Video Test

Video testing is done by giving questionnaires to 20 respondents who are given using a link, which includes a simulation video of ordering train tickets that has been made by the author. The questionnaire contains five questions. Before answering the questions respondents were asked to fill in their names. Questionnaire questions are in the form of multiple choice consisting of four choices a, b, c and d and are answered by choosing one of the answer options according to the respondent's choice, and one last question the respondent gives an answer in the form of a description. The following are the percentage results of the five multiple-choice questions obtained from the respondents' overall answers, which can be seen in table 3.

Table. 3 Percentage Result of Questionnaire Testing Simulation Video of Train Ticket Booking Procedure Based on 3D Animation

No.	Question	Answer Correspondence				Information
		A. Very Understand	B. Understand	C. Enough	D. Less	
1.	Can this 3D animation-based train ticket booking procedure video help people who don't understand the train ticket booking procedure, both online and offline?	17 (0,17)	2 (0,2)	1 (0,1)	0	85% of respondents stated "Very Helpful", 10% "Helpful" and 5% "Enough" that this simulation video of the train ticket booking procedure at XYZ station helps people who do not understand the procedure for ordering train tickets, both online and offline.
		Calculation Results Question No. 1 achieved out of 20 Respondents				
2.	Can this 3D animation-based train ticket booking simulation video be an educational medium, especially to find out the procedure for ordering train tickets, both online and offline for the general public?	16 (0,16)	4 (0,4)	0	0	80% of respondents stated "Very Can", and 20% stated "Can" that this 3D animation-based simulation video of train ticket ordering procedures is one of the educational media to know the procedure for ordering train tickets both online and offline for the general public.
		Calculation Results Question No. 2 achieved out of 20 Respondents				
3.	Does this train ticket booking procedure simulation video provide a clear and easy to understand explanation of the steps for ordering train tickets?	17 (0,17)	3 (0,03)	0	0	85% of respondents stated "Very clear" and 15% stated "Clearly" that this simulation video of the train ticket booking procedure provides a clear and easy-to-understand explanation of the steps for ordering train tickets.
		Calculation Results Question No. 3 achieved out of 20 Respondents				
4.	Based on the simulation video of ordering train tickets made by the author, can 3D animation be used in delivering education?	18 (0,18)	2 (0,02)	0	0	90% of respondents stated "Very Can", and 10% said "Can" that 3D animation can be used in delivering an education.
		Calculation Results Question No. 4 achieved out of 20 Respondents				
5.	Previously, how well did you understand the procedure for ordering train tickets, both online and offline?	0	1 (0,01)	3 (0,03)	16 (0,16)	80% stated "Less", 15% said "Enough" and 5% said "Understood" that many respondents still do not understand the procedure for ordering train tickets both online and offline.
		Calculation Results Question No. 5 achieved out of 20 Respondents				

Based on the percentage results from several questionnaire questions about the simulation of the train ticket booking procedure above which are the answers from twenty respondents, the authors draw the following conclusions:

- 1) This 3D animation-based train ticket booking simulation video helps educate the general public about the procedure for ordering train tickets, especially at XYZ station.
- 2) This simulation of ordering train tickets based on 3D animation can be an educational medium to find out the procedure for ordering train tickets for the general public.
- 3) 3D animation facilities can be used as an innovation in delivering education, especially education on simulation of train ticket ordering procedures, especially at Medan stations.
- 4) This 3D animation-based train ticket booking simulation video provides a clear and easy-to-understand explanation of the steps for ordering train tickets.
- 5) There are still many general public, especially the people of XYZ city who still do not understand about ordering train tickets both online and offline.

4. CONCLUSION

After performing the steps in the process of making a simulation of the procedure for ordering train tickets at the XYZ train station based on 3D animation with the pose to pose method, the following conclusions can be drawn:

1. Simulation of the train ticket ordering procedure using the pose to pose method, the processing time is relatively faster, the animation motion produced is more conceptual, errors found in setting poses can be easily corrected.
2. The simulation of ordering train tickets based on 3D animation is one of the educational media to find out the procedure for ordering train tickets for the general public.
3. 3D animation facilities can be used as an innovation in delivering education, especially education on simulation of train ticket ordering procedures, especially at XYZ station.
4. Of the two types of train ticket booking methods, namely online and offline, online has a faster time.

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