Live 2D Virtual Character Development
on Online Streaming Class

Art In Social-Technological Change

Darfi Rizkavirwan[1], Ken Violeta[2], Vincent[3]
[1,2,3]Universitas Multimedia Nusantara
E-mail: [1]darfi@umn.ac.id, [2]ken.violeta@umn.ac.id, [3]vincent@umn.ac.id

Abstract

The learning system got a significantly huge change because of the pandemic which made on-site studying not possible. One option that is currently used now is using online meetings for classes, in the post-digital age it is still very efficient to use online meetings even after the pandemic is over and it is possible to meet face to face with either student or lecturer due to its practicality, it is easier to use online meeting if we have a larger amount of audience or if we decide to invite people from far away. Disadvantages of using online classes are, students get bored easily because of the lack of interaction and there can be more distraction when you are at home. Using other methods online classes can be made more interesting, one possible solution is using a virtual character to substitute the teacher. Virtual characters are recently used for streaming and content creation in streaming platforms, these virtual characters use Live 2D and face tracking. Using virtual characters can be one of the solutions that can be used to build a more interactive and interesting learning experience. Making live 2d character is parted into several steps, first step is to make the main design of the character, after that the design needs to be split into several parts to be animated separately for example the face needs to be separated into different parts like head, ears, eyes, nose, mouth, and hair, each parts needs to be separated further, each part will be animated in a separate timeline to give it a volume so the character can turn, nod, and tilt their head, all this is done with a deformation system in Live 2D software. After the process of animating the live 2d model, the results can be tested in a face tracking software. After that the face tracking software can be streamed straight to the online meeting apps or OBS can be used as a medium, so it is easier to set up the streaming layout. With the addition of a virtual character to substitute the teacher it is possible to make online classes more interesting and interactive.

Keywords: virtual character, live 2D

Live 2D Virtual Character Development on Online Streaming Class
Live 2D character in this case is used as a replacement of a lecturer or teacher, based on focus group discussion and user testing this method is effective for gaining the attention of students. Although the pandemic is over this method can still be used for online meetings and online workshop, because it is more efficient to do so due to ease access. Based on review and testing students prefer characters that resembles the actual speaker because it is more recognizable and more familiar.

BACKGROUND
The learning system got a very significant change because of the *Covid-19* pandemic, this makes onsite learning and going to universities or colleges not possible for safety and health reasons. One option that can be used is using an online meeting platform to host classes. Online classes limit the interaction and communication between students and lecturers, also there are more distractions which would not be found at school or university. These limitations will be a challenge for universities and schools to find a way to teach more interactively so that students will be more enthusiastic towards the subject.

Based on that background a way to get the attention of students is to create something that is entertaining or eye catching to them. According to data from *Social Blade* (2022) the entertainment in online streaming platform is dominated by Virtual Youtuber/Streamers, among the many vtuber the most stand out viewer counts are from Hololive and NIJISANJI entertainment company. The concept of Vtuber is using virtual characters for streaming or making Youtube videos using motion tracking. This concept can be adapted to be used on online meetings in a hope that we can get the attention of the students and viewers.

The media that will be used in online classes are virtual characters that will track the expression and movement of the speaker to attract the attention of student while giving lectures and materials. Although the pandemic is over, these online classes are still very efficient to be used as a media because of the ease of use, access, and archiving purposes. So in order to support the use of online meeting and make it interesting to the eye of students/viewers this research with the title *Live 2D Virtual Character Development on Online Streaming Class* is made.

DISCUSSION

Designing a character that can represent the teacher/speaker will need to have a suitable character and personality from its visual design; based on the article How to Create a Brand Mascot by Atanasova (2021):

1. Choose the right character means what kind of character is going to be used, human, animal, or object characters, while deciding what character to use it depends on how you want to use the mascot, is it to represent a real person, selling a specific product, gives services that relate to an object, is the product/services associated to animals, or do you need the mascot to be associated with the values of the brand.

2. Think about the personality of your character, planning out on how the character would act or a certain archetype for the character.

3. Planning visual and content marketing strategy, plan on how the character is going to be used in content, will it have a comic, website, or in social media post.

4. Choose poses, emotions, outfit, and scenes, decide on how the character will move, act, speak, and wear, also the emotions and the background scenes of the character.

5. Design the character, after deciding all the factors above the process of making the design can start.

Using the method currently there are two designs that are produced 1 is a human female character with casual clothes resembling a young lecturer, and the other is a more cartoonist, humanoid bear character. Both of these designs are made based on the trend according to *Social Blade* (2020), In the database, multiple female characters grew prosperous in the entertainment industry, so the first design tried to take the trend and use it for educational purposes. Based on Atanosova (2021), because the goal of this research is using virtual characters as a replacement for lecturers it is recommended to use human character. The second design is made based on focus group discussions and short interviews. The amount of respondents is balanced on voting towards both methods, so both design concepts are made to be tested on user test. For the case of personality, poses, and emotions, because we are using a face tracking method, the emotions and personality are captured by the speaker. Hence, the design of the personality poses, and emotions must picture the speaker using the virtual character. The visual content made with the character is using it as a presenter of an online class.

The character that has been designed will be animated using live2D methods, the methods used will be referencing *Live2D Model Making Course* by Fumi (2019).

1. Setting up the design and making the live2d models, after designing the character, the next step is to separate the design into smaller parts for example separating the face into the head shape, mouth, nose, eyes, ears, etc.
2. Defining the 2D mesh, Live2D application can generate mesh for 2D objects for warping its shape.
3. Animating facial features, in this step the animation process is for making facial features move, blinking eyes, moving eyes, expression, and mouth movement. This process uses a parameter system. This parameter system can be used as keyframes to set how much the mouth will move and how far it can move.
4. Setting up and using warp deformer, warp deformers are used for deforming a single or a collection of objects. This method is used form making the face turns right and left.
5. Rotation deformer is used for making rotation movement. This former can also act as a rig for the mesh.
6. Recording animation with parameter, the value of the parameter can define how sensitive the face tracking will be while using 0 to 30 parameter more tiny movement will be detected while using face tracking app.
7. Physics, setting the physics for the hair and other accessories will use pendulum system with more joint the physics will be softer.
8. Setting up default poses and expressions, using Live2D Viewer poses and expression can be defined by using certain parameters.

After finishing the live2D process, face tracking and setting the streaming layout can be done by using Vtube Studio and using window capture device from OBS to determined the layout of presentation, after that OBS can use Virtual Camera to stream to online meeting services.Based on that, the steps for making the virtual character models are designing the base concept of the character, separating the character assets, this can be done before making the finished rendering or during the rendering process, each option have their advantages such as, when separating the assets after the render is finished selection tool can be used to cut the assets and fill in the part where the assets are cut but on the other it is harder to make a seamless color or shading. When separating the assets during the render process it is easier to plan out what moves and what doesn't, and it is much more efficient because there is no need to make seamless color and shading after the initial cut. In this case this research used the second steps, after the main design and character sheets are done, sketches of the separated assets are made for each body part, after that we can start to color and finish each part on a separate layer.

Figure 1. Example of Live2D Assets Separation and Converting
Image to 2D Mesh

After that, the rigging process can be started. The rigging process is similar to 3D rigging because the character assets are converted into 2D mesh. Rigging the Live2D is not giving bones and weight painting it is more like warping the image to make it look like it has perspective. When making the head turn left and right the head assets need to be warped so that it looks like the head turns.
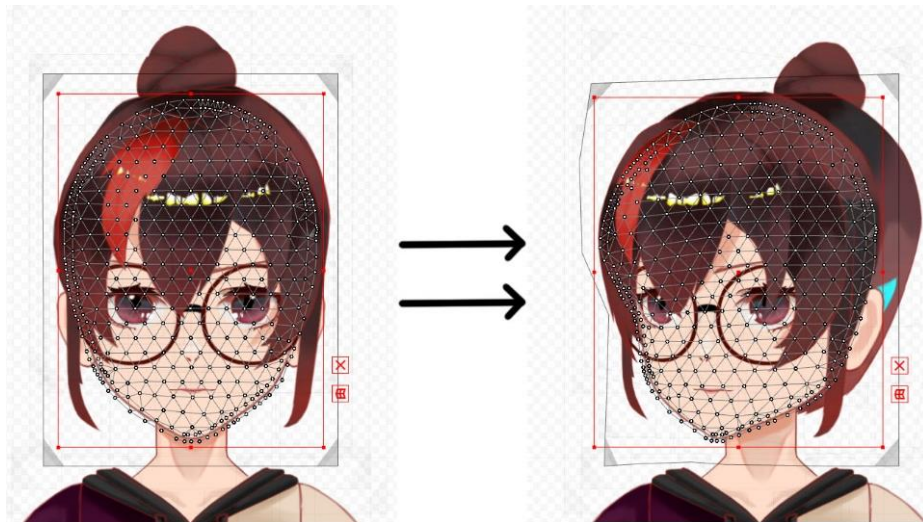

Figure 2. Example of Rigging Head Asset

Using the live2D model for online class the live2D model needs to be setup with Vtube Studio first, Vtube Studio can use the webcam or camera connected to the device for face tracking, after the setup is complete and the software can detect facial expression and movement the next step is to setup a streaming layout with OBS.

Figure 3. OBS Layout

After setting up a layout on OBS, Zoom can use the Virtual Camera on OBS to use the layout on OBS as a Camera and Stream it to Zoom meetings. After that the teacher can start using the virtual character as a replacement for their face.

Testing for the virtual character are done with the intent of getting the viewer first impression and their opinion about using the virtual character, from 10 students that volunteer for this test all 10 says that it is very surprising when they first came in to the online class an sees a virtual character that greets them, at first most of them thought that the character is a virtual background or a profile picture but when the virtual character responded all of them give a positive feedback. They also give their opinion about online and offline classes and 8 out of 10 agrees that online classes are more efficient to take but it needs something more to make it more interactive and interesting, they also agree that virtual characters can get their attention but it has to be used correctly for example if the teacher use a very detailed character the students will more often concentrate on the design and the movement of the character instead of listening to the teacher. While testing the virtual character we use two different designs to test the first one is a young female character and the other one is a cartoonist bear character, between the two designs there are a balanced amount of students that choose each one because they have their own preferences but all of them agree that the female character one is more distracting than the bear ones, one reason is because the female character have a more detailed movement and motion range, they focused more on the technical aspect of the character than the subject that is brought to them by the teacher using the character. Also, they all agree that it is more interesting a more familiar if the virtual character is designer after the actual speaker.

CONCLUSION

The virtual character approach built better interaction, response, and engagement in a class than in regular online classes. The use of virtual characters in online courses can provide thematic flexibility for presenters based on the class topics to be delivered. Not only the appearance of the presenter's character but the background exploration space can also be optimized in such a way as to support the effectiveness of the class.

There are some insights regarding the further development of this research. For example, the focus of detail on the movement of facial expressions from eyes, mouth to hair is a detail that must be optimized. It concerns the reality of the presenter. Because of this, the details of making facial movement animations must be more detailed. This also includes head, shoulder, and other movements.

Using human characters in the case of class or representation of the presenter is a must. At the same time, the use of non-human characters is not recommended. Non-human character is considered dishonesty by a presenter educator by the class participants.

Further development is the exploration of the presenter's setting and the exploration of the half body as a form of virtual appearance of the character. With the virtual character approach, it is expected to be able to provide a better experience in learning in online classes.

REFERENCES

Atanasova. (2021). *How To Create a Brand Mascot?* Diunduh dari
https://visualcontent.space/how-to-create-a-brand-mascot/
Fumi. (2019). *Live 2D Model Making Course.* Live2D.
Social Blad.e (2020). https://socialblade.com