The Role of Digital Animation Workflow in Sustainable Fashion Publication

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Abstract. In the waste leakage of the fashion industry, it is not only a price for the environment, society and psychology, but it is also causes a negative impact on other fields. Now fashion industry has transcended the realm with digital technology in phenomenons of CGI content. The answer about what is happening in the world of fashion education, fashion students should also be familiar with the digital environment, especially for publishing their work. This paper explains how to design fashion animation content for its publication, which the process is involving fashion student in their study, who do not make animation techniques in their consideration as their main field of knowledge to get ability to publish their work. With project based research method, that is every step of production stage that fashion student and author uses to achieve the shortest and easiest workflow, it is also become our recommendation model workflow for curriculum development in fashion study especially in fashion publication.

1 Introduction

Fashion is associated with trends, which has specific style and design at a particular time span, sociocultural and many factors that can be happening caused by popular culture, social media and digital information technology[1]. Fashion Industry not only uses natural materials but also a lot of synthetic that creatively designed as clothing. Fast fashion that has significant impacts to the environment [Fig 1], synthetic materials and chemical produces low quality product for the sole purpose of accelerating mass production[2]. During the Pandemic many people reconsidering their consumption in purchasing fashion, its impact the income that has led many people seek more affordable price when it comes to fashion and become conscious about the environment[3], they do thrifting fashion to fulfil the styles and design for more anti-mainstream look. In order to maintain the waste generated by fashion industry, many ways to achieve cleaner activities, such as conserving natural resources, recycling the materials, more durable materials or repairable, maximizing value through any strategies for more sustainable and circular approaches.

Animation in fashion industries visualizing a prototype in fashion design, with advancements technology the fashion design can delivered realistically and more dynamic workflow, fashion designer can simulate the movement, material fabric specifically, and how the garment drape in a body. Fashion designer can use the software for more accurate and detailed design for reducing physical prototypes needs. Virtual try-on in 3D fitting virtual room gives realistic virtual representation of the fashion product to consumer before they make a purchasing, user experience when trying and see the detailed garment visualization from multiple angles and other improvement sense to make confident decision from the consumer[4]. Digital media like animation can reduced paper waste, which is replacing the printed media, reducing energy consumption, and transportation effort and cost.

Fig. 1. Environmet impact of fast fashion, Getty Images | Ziga Plahutar

In fashion design education, not only the creative study in order to keep up with the needs of global industry and society creative leaders, but also study about environment interests, which has practices and responsibility to support more sustainable eco-friendly in industry. The authors involve the fashion publication initiative project with one of educational institution, Binus Northumbria School of Design [Fig 2], Fashion design program, which has concerns about environmentally friendly, by using green concept that the student achieved and need to be published in

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effective media by using animation can deliver information about fashion traits, such as a fluttering cloth, collision movement and how garment drapes on a body that processed in simulation. Besides the movement, animation can visualize material properties that affected by lighting, it shows photo realistic visuals. In this paper, authors will also discuss about how animation can provide fashion publication needs to give an alternative representation of the conventional way.

Fig. 2. @binusbnsd post, environmentally friendly at Instagram

2 Literature Review

Authors need many literature reviews to get the opportunities related to the project, the digitisation in fashion is relatively common practice in animation and games, as well as film, character design garment in production design gives narratives to the audience [5], computer aided design (CAD) software that used in those industry has effective and efficient features such as Marvelous Designer, overall the representation workflow in that software has similar practices with fashion design process, making 2D pattern, sewing, setting button, fabric textures, zipper and fitting are common term that in use. With technology, digital tool and technique used to visualize fashion design looks more realistic, this can be shown that how’s wrinkles in garment treatment. The easiest access to have knowledge about this software is from its help center [Fig 3].

Fig. 3. Marvelous Designer help center support.marvelousdesigner.com

Digitisation in publicize fashion, like fashion show has evolve from non-interactivity classic fashion show, digital fashion show without interactivity, virtual reality (VR) fashion show without interactivity and interactive VR fashion show to gain user experience [6]. The fastest and easiest to access is virtual try-on gives effectiveness user experience, although some gap in accuracy of human body shapes and sizes, different fabric materials and characteristic gives different collision movement[7]. Overall, transferring process in media to digital has its own challenges.

Fig. 4. MetaHuman Creator from metahuman.unrealengine.com

To achieve visualization in 3D animation, the basic workflow or pipeline starting from 3D modeling, texturing, rigging, animation, lighting and rendering[8]. In 3D modelling many methods that have been used, MetaHuman creator facilitate us for create photorealistic looks [Fig 4], photogrammetry by using polycam, LiDAR & 3D scanner also generated polygon that not yet ideal in topology, and must be retopologize for more usable deformation and transformation 3D model for animation. When using MetaHuman Creator and Quixel Bridge, this method is more effective to link in Unreal Engine, beside the shading, lighting and rendering that will be instantly achieved, the rigging process should have adapted from MetaHuman and refined[9] in Unreal Engine. Using motion capture and readjusted with manual keyframe for designing stylized movement and to achieved combination with naturalistic motions relatively easy[10]. During and after pandemic with the changing into digitisation media and format, especially using 3D animation for publication media, fashion should have deeper engagement with the public and meet our expectation, in this project based research.

3 Propose Method

Author in this study uses qualitative descriptive from our project based research, data were acquired from literature studies, self software learning from MOOC for students and publication material creation method in 3D animation production process [11]. The comparison pipeline for fashion animation publication, which gathered from interchangeable digital file format for the creation of CGI content will be examined for student scientific needs.

4 Result and Discussion

The authors collaborated with animation program study and fashion design (international program) under Binus
University, we set goals to be achieved in this initiative project and research at a time. First, the connection between education interests and how to digitisation the creation process in fashion should be accommodate, the software selection for the student isn’t CLO, but Marvelous Designer, considering the support of their living in digital world and space, Marvelous Designer is more friendly with CG pipeline, like UV Editor[12], that support their digital learning outcomes. The learning process outside of digital life, about how fashion creations are needed to hone the craftmanship goals. Second, the project concentrates more in digital publication. implementation using vertical LEDs is expected to provide visuals that blend with the real environment, as if presenting a model with the same size as real life but in a digital display, both involve student participation.

The online-learning for student to have knowledge about how to use the software tools is adequate, beside from MOOC sites, YouTube and Marvelous Help Center to learn the software, Learning by doing and troubleshooting cases are effective. The authors also trying to develop first step to provide 3D human model, the Mixamo.com by Adobe is the suitable for production complement, Mixamo is use for 3D rigging, animating and modeling, the program is intuitive and flexible[13]. The author did not consider using MetaHuman to create the mannequin model, in this case highlighting and emphasizing the visuals on the clothes that we want to display. The author export the avatar Marvelous Designer and automatically has rigged in uploaded Mixamo, when its finish, downloaded as .FBX format file [Fig 5].

The author choose the animation library by typing catwalk keyword [Fig 6], and download several animation collection for designing avatar posing movement. The avatar animation concept not include walking like on catwalk, but only standing and posing with slightly idle animation.

![Fig. 5. Basemesh model, avatar from Marvelous Designer](image)

![Fig. 6. Catwalk motion library in Mixamo](image)

![Fig. 7. Fashion design artwork by student.](image)

The fashion design works that have been made by students is already finish [Fig 7], but in this project is used as references. The concept of the fashion design mostly taken from local culture. Amadea Calista, Elandra Putri and Melvina Jocinta have succeeded in doing her project with the theme of Banten entitled Kanagara Amerta, depicts the reactions to the story, which include sorrow, hope, beauty, and dignity. This collection includes a narrative about the Krakatau volcano catastrophe. The designer wants to convey the personality of a significant portion of Indonesia. [Fig 8], the other collection entitled “Cahya” by Shafa Praditya, Chanreaksmey Loy and Jennifer which is highlights the people of Baduy who reside far from contemporary civilization, peacefully and alone in the middle of nature[Fig 9].

![Fig. 8. Fashion design artwork by student.](image)

The students have successfully learned to transfer their art works into 3D digital formats, which can be seen in pictures from Marvelous Designer rendered image, the element garment shapes and textures are also applied, the 2D pattern and sewing relatively can accommodate the reference design [Fig 10]. Learning through the massive open online course can be followed by students, to recognize how to transfer the process from pattern making which is done physically to digital patterns in the software. The terms used in the features also have a relatively similar approach to terms used, such as pleats, folds, setting buttons, seams and inner seams so they can be understood. In the process of making 3d garments, the size and dimensions of the proportions are like real world scale. students are required to translate their knowledge in calculating size and considering the shape of the fall of the cloth, this is related to the ability of the software to take into account
the simulation of the interaction of the garment with the avatar’s body

Fig. 8. “KANAGARA AMERTA” collections by Amadea Calista, Elandra Putri and Melvina Jocinta

Fig 9. “Cahya” by Shafa Praditya, Chanreaksmy Loy, Jennifer

Fig 10. The results from Marvelous Designer, done by student.

By photographing the garment details, the author is able to make images that are of the correct quality for the textures [Fig 11] for images texture the images must be photographed flat. The photographed images result [Fig 12] containing detail pattern will be placed in certain area of proper UV coordinate. After the 2D pattern are done, and the draping simulation has been made well. Marvelous Designer with UV editor and property editor, especially physical property relatively easy to use, the preset of the characteristics of the fabric are all there [Fig 13].

Fig 11. Photosession to get images texture
Using the animation feature in Marvelous Designer [Fig 14] is next step before the animation get the shading, lighting and rendering. In this feature the garment movement is what we need that affected by collision avatar movement. The weight, form, and fabric of the garment, as well as the wearer's actions and posture, can all have an impact on it. The swing of a garment can influence both the wearer's comfort and mobility as well as its overall visual appeal. The complete recorded animation to the garment in animation features of Marvelous Designer will be exported in Alembic (Ogawa), the author assumed that format is faster and has smaller file size. In this project case, the animation should have loop animation, in order to maintain the pose of the start and the end exact keyframing, the author stringing the FBX animation collections which has been downloaded from mixamo into non linear animation clip in Blender, therefore, if we import it into Marvelous Designer, the avatar already has the animated movement that we want.

Shading, lighting and rendering is the next step to create high quality animation. The author using Blender to develop the scene, in this case the goal is movie format with 1080 pixels and 1920 pixels portrait resolution, considering will be playback in vertical standing LED.

The Alembic that exported from Marvelous Designer will be import in Blender and set up the scene with additional background and floor like limbo in a photography studio, by using camera view to achieved full shot of animated mannequin model and garment in-framed composition [Fig 15].

The author used cycles rendering to get global illumination and more realistic-looking materials, and the settings for the materials and lighting are as follows. Instead of using eeve, cycles more accurate to produce realistic images and shadow for animation, while in eeve is for realtime interactive experience. We can see the rendered result samples[Fig 16], the highlight, midtones and shadow are showing the smooth surface at the same time the shading due to indentation of the garment also.

Overall, the fashion animation pipeline by using Marvelous Designer for the main fashion design software and 3D editor (Blender) by using 3D interchangeable file format, such as .OBJ (wavefront object) and .FBX (filmbox) are important. The online Mixamo library, provide the fastest assets to design the movement. The production pipeline starting from preparing the avatar model from Marvelous Designer
until final rendering process are effective way, Nevertheless, the pipeline does not completely rule-out the potential of revision, therefore we must go back [Fig 18].

Fig 17. Shading, lighting and rendering in UE

Fig 18. The revision notes in draft resut

It is clear that the requirement to use pipelines makes it possible for fashion students to study without having to complete specialized training in the field of animation in order to publish their work using digital media. Starting from transferring marvelous designer patterns into clothing forms and continue to constructing rigging and movement in Mixamo, simulations, and producing animations like those shown in the animation pipeline chart[Fig 19].

Fig 19. The fashion animation pipeline

5 Conclusion

The transferring media to digital carried out by fashion students has been achieved, The Marvelous Designer serves as a more strategic and CG-related tool for their needs, allowing them to promote their artwork in particular by using animation to display the movement and characteristics of the clothing. The digitisation creative process in fashion to make a digital prototype are saving time and energy by using choosen fashion animation pipeline for creation guidance for production reference before creating the final design. In order to conserve resources, a simple and quick approach for publishing fashion through animation in the digital environment is an alternative to traditional fashion shows.

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