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Creation of a 3D Digital Fashion Show with 3D Virtual Prototyping of Clothing

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Creating 3D virtual prototyping of clothing using 3D digital software allows producers of fashion and special garments to reduce their development costs and the time taken to create real prototype products (Stjepanovič et al., 2012). 3D virtual prototypes are presented to designers, merchandisers, and clients for evaluation and confirmation (Stjepanovič et al., 2012). Based on the evaluation of these virtual prototypes, the final clothing products can be easily modified and produced. Furthermore, 3D digital fashion shows, which mix digital technology with the traditional idea of a fashion show, allow audiences (designers, merchandisers, clients, and customers) to appreciate a collection through a monitor screen without having to hold a real fashion show (Wu et al., 2013). It also enables designers to easily articulate and create their design concepts and ideas (Wu et al., 2013). The 2D/3D computer-aided design (CAD) course aims to improve students' (n = 23 in fall 2015; n = 21 in fall 2016) capabilities in fashion CAD applications from the design to the pattern-making process to the creation of a 3D digital fashion show. The content, exams, assignments, and class activities of this course are integrated into the 2D/3D fashion CAD software applications (i.e., Optitex, Adobe Illustrator, and Adobe Photoshop). The objective of this class project was to (1) create a plan for the product line, (2) develop 3D virtual prototyping of clothing by combining 2D and 3D visualization software such as Adobe Photoshop and Optitex system, and (3) ultimately create 3D digital fashion shows using 3D technology.

Step 1. Creating a concept map for the theme, color schemes, fabrics, and styles. Each student created a concept map/mood board regarding his/her own collection, containing images and descriptions of a specific theme, a target market, competitors, color schemes, fabrics, and style directions, using PowerPoint and Adobe Photoshop.

Step 2. Creating 3D virtual prototyping of clothing: Pattern-making, textile design, and 3D simulation. Based on his/her concept map/mood board, each student modified existing basic digital patterns or created new digital patterns using diverse tools within the Optitex system for dresses, blouses, jackets, pants, and skirts. Then, each student newly created his/her own textile design using Adobe Photoshop, or selected appropriate images of fabrics from Google Images, created a JPEG file, and then changed the fabric colors based on his/her own color scheme using Adobe Photoshop. The fabric layers/shaders were inserted into 3D virtual prototyping of the clothing. The fabric textures (e.g., shininess, transparency), fabric print positions, and scales were modified using the move texture tool and the shader functions within the Optitex system. Then, the 3D virtual garment draping and simulation results with a 3D virtual model were visualized. Each student created five-to-eight outfits (see Figure 1).

Figure 1. Examples of 3D virtual prototyping of clothing taken form the student projects created by the students Kimberly Sainz, Kaimipono Kajiyama, and Kamele Ah You

Step 3. Creating 3D virtual animations and video files of 3D virtual catwalks. To create a 3D virtual animation video file, each student used a 3D animated model and performed 3D animations using the Optiex system. Avi files from the Optitex system were created. Using the Windows Movie Maker program, each student combined each avi file based on his/her desired virtual catwalk order. The speed and duration of the virtual catwalk were adjusted based on each student's preference. A catwalk-music file, a cover page, and an end page with texts and screen transitions were added. A finalized video file was then published (see Figure 2).

Figure 2. Examples of the 3D virtual digital fashion show taken from the student projects created by the students Tina-Tai Ngo, Rebecca Scott, Jia Xing Lin, Marinett Devine Diaz, Kaimipono Kajiyama, and Lory Wong

Step 4. Creating a digital portfolio. A digital design portfolio, containing a concept map, 3D virtual prototyping of the clothing with 3D virtual models, and design descriptions, was created using PowerPoint. Systematic assessments of the use and significance of design elements and other aesthetic factors were conducted with reference to the 3D virtual prototyping of the clothing. Finally, each student inserted a video file of his/her 3D digital fashion show into a PowerPoint slide and made an oral presentation.

The students successfully completed the planning of their own collection, the 3D virtual prototyping of the clothing, and the presentation of a 3D digital fashion show. They indicated that the best aspect of the project was that all the students were able to showcase their finished designs and conceptual ideas. They liked being able to develop virtual prototyping without wasting fabric. For simplified 3D virtual prototyping of clothing, the students were able to easily create 3D animations. However, for complicated 3D virtual prototyping of clothing, involving many patterns and details, the process of creating the 3D animations was very slow, or the 3D animations stopped suddenly and eventually failed. The process required a time commitment. Therefore, each student created a 3D digital fashion show collection that included five-to-eight 3D virtual catwalks. One of the video files containing each student's one representative garment was uploaded to YouTube (watch a video, https://www.youtube.com/watch?v=98T34aZWEg8&t=21s). In terms of the future plan for teaching about the creation of a 3D digital fashion show, a 3D virtual tour of a retail store design will be integrated. The audience will watch a 3D digital fashion show and then enjoy a virtual tour of a 3D retail store containing 3D virtual prototyping of the clothing that appeared in the 3D digital fashion show.

References

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