



Virtual Design Pedagogy: Understanding the Metaverse and Improving Creative Design Skills using ZEPETO Studio Platform™

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Introduction. Digital technologies have steadily developed in a variety of industries (e.g., fashion, automobile, entertainment, etc.). These technological innovations prompted increased attention to the virtual world and online virtual community environments. Integrating technologies (i.e., virtual reality, augmented reality, 3D experiences, artificial intelligence, etc.) play a vital role in daily life in terms of teaching, learning, social interaction, and communication (Lee, 2021).

The Metaverse is a new three-dimensional virtual convergence platform with avatars that can act on behalf of users in the real world (Friesen, 2017). The Metaverse integrates a variety of emerging and immersive technologies (Mystakidis, 2022; Wang et al., 2022). As a highly technological approach to learning in academia, the Metaverse could provide learning and teaching tools that foster positive experiences (e.g., with course content, classroom settings, and unlimited resources) and deepen students' knowledge through the integration of technologies. In terms of higher education, instructors and students are interested in the Metaverse; however, there is a lack of activity instruments and content to create fashion products using the Metaverse platform. Moreover, most college students have had little practical experience with 3D platforms, and 3D design software can be very expensive.

The ZEPETO platform (including fashion items, the virtual world, a live-action interface, and build-it) is an avatar platform that has sold 68 million fashion items, boasted 2.3 million studio creators, and had 300 million users worldwide (<https://zepeto.me/>). Currently, well-known fashion brands (Gucci, Nike, Ralph Lauren, Zara) have collaborated with a ZEPETO digital fashion platform™ using 3D avatars in the virtual world. The purpose of the study is to (1) understand the Metaverse and the virtual product development process, (2) create fashion items with 3D avatar simulation in the virtual world, and (3) enhance students' creative thinking skills. The activity enables students to translate their ideas into virtual fashion items in ZEPETO Studio™. Thus, this study contributes to widening design course content regarding design and entrepreneurship, embracing Metaverse practices and initiatives for current or future generations.

Experiential Learning Theory (ELT). This study is framed theoretically using Experiential Learning Theory (ELT). ELT allows students to take an active role by learning through doing (Smart & Caspo, 2007). During ELT activities, learners can access the information by experiencing either the concrete or the abstract aspects of the assignment. This flexibility in how learners approach information allows ELT

activities to accommodate different learning styles (McCarthy, 2010). The ELT can help students generate knowledge by transforming the experience they gain through student-centered activities (Kolb, 2014; McCarthy, 2010). ELT has been successfully implemented in Apparel, Textile, and Design pedagogical studies (Gopura et al., 2021; Smith-Glaviana & Martinez 2023).

Method. This study engaged with ZEPETO Studio™ to facilitate students' creation of fashion and dress items via simulation. A total of 43 undergraduate students who enrolled in fashion and retail merchandising courses at two large southern universities, in the United States participated in this study. Students did not have experience regarding metaverse or virtual design to create any fashion items using virtual platforms. Most students were female. Among the students, 53% were juniors followed by seniors (23%), freshmen (14 %), and sophomores (9%). The researchers administered a questionnaire including three sections: (1) general information including demographics, (2) creating fashion items with an avatar using the ZEPETO™ studio platform, and (3) learning experience (pros and cons). Using SPSS software descriptive statistics, the data were analyzed to help report students' feedback and their outcomes regarding ZEPETO™ activity.

Results and Discussion. This study not only focused on understanding Metaverse and virtual fashion product design with 3D avatar simulation in the virtual world but also enhanced students' creative thinking skills. Using the ZEPETO Studio™, students preferred to create virtual fashion products including dresses, skirts, pants, crop tops, and hoodies as item categories in ZEPETO Studio™. 72% of students were interested in and enjoyed working on this activity because it was easy to use and gain inspiration, helped their creative skills, and looked at the overall outfits they created through their avatars. In other words, the study enables students to translate their ideas into virtual fashion products as one of the class projects. On the other hand, the other students (28%) had a few technical issues (e.g., log-in, recent version), and needed to make limited size (e.g., Max 512 x 512 pixels) and file format (e.g., Portable Network Graphic), as well as wanted to make actual apparel garment instead of unrealistic items. Despite these disadvantages of using the ZEPETO platform, the learning experience using ZEPETO Studio™ brought positive outcomes to the creative design process and enhanced students' behavioral intentions using a 3D platform. Therefore, this study will contribute to generating design courses (e.g., fundamental fashion design and introduction to product development), embracing Metaverse practices and initiatives for current or future generations. This study engages with ZEPETO Studio™ to facilitate students' creation of fashion and dress items via simulation while addressing both the lack of design practice platform availability and product development pedagogy via the virtual platform, Metaverse. We recommend ZEPETO Studio™ activities to provide a prominent and creative venture for computer design applications and product development courses. This activity not only encourages students to express their creativity but also allows students to have fun and generate income after becoming creators in a virtual world. In other words, this activity can bridge the connection between theoretical content and immersive technology. ZEPETO Studio™ is a practice tool for educators by applying ELT to motivate the learning experience among students who can directly create and sell various fashion items (e.g., clothing,

footwear, accessories, etc.) using 3D avatar simulation in the virtual world. Upon completion of the study, therefore, students achieved the following learning outcomes:

1. Investigate and analyze current virtual market research and product designs.
2. Recognize various ideas and concepts for fashion items.
3. Understand the overall process of 3D virtual products.
4. Develop their creative and evaluation skills in Metaverse using advanced technology.
5. Discover the main fashion items to activate a Metaverse platform.

In sum, this ZEPETO Studio™ activity encouraged students to implement more and expand on other industries (e.g., furniture, architecture, medical, game, entertainment) related to 3D virtual products and advance educators' efforts in providing up-to-date, practical activities with opportunities to challenge and shape future industries. Developing and creating content and products using ELT with 3D avatars in the virtual world, and 3D platform research will contribute to expanding virtual world use and applications as a pedagogical method in academia and industry, for current or future generations.

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