

A Virtual Reality (VR) Apparel Design Exhibition:
Exploring Students' Experiences During the COVID-19 Pandemic

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Background and Purpose. The COVID-19 pandemic has created significant challenges in higher education, especially in the apparel and textiles discipline because the traditional channels for students to disseminate their work, such as live fashion shows and design exhibitions at a gallery with an invited audience, have not been available. The pandemic has necessitated the exploration of new and effective ways of disseminating physical and digital apparel artifacts that encourage interactions between designers and viewers. In this study, both designers' and viewers' experiences of a 3D virtual reality (VR) design exhibition created using Mozilla Hubs was examined (Pye, 2022). Through the 3D environment, viewers were able to “walk around” a gallery to view apparel designs, posters, and videos and to “interact with each other” in the gallery room (e.g., using the chat function and a personal avatar). This study aimed to explore a) students' experiences of showcasing their apparel design work through a VR design exhibition and b) students' experiences of viewing a VR design exhibition during the pandemic.

Theoretical Framework and Significance. Davis's (1989) extended technology acceptance model (TAM) was used as a foundation for this study. The research constructs for the quantitative phase of the study include perceived usefulness (U), ease of use (EU), enjoyment (EN), and adoption (AD). Researchers have validated TAM as a parsimonious framework for understanding users' adoption of technology in a variety of contexts, including students' use of smartphones and video games (Wang & Goh, 2017), but no previous study has examined students' adoption of VR exhibition technology. The results of the study provide insights into how students' perceive the use of VR exhibition technology from their perspectives both as designers and viewers. The study provides a framework for providing an effective supplementary dissemination channel for educators to promote students' visual work.

Method and Strategies. *Part 1. Designers' perspectives: Interviews with students.* One-to-one Zoom interviews were conducted with 11 senior students who presented their garments in a VR exhibition space created using Mozilla Hubs. Students' garments were 3D scanned using an LiDar 3D scanner; about 150–200 pictures were recorded for each outfit, and the gallery space included posters that showed the designers' inspiration. Each interview was recorded and transcribed verbatim, and content analysis (Corbin & Strasuu, 2008) was used to identify emergent research themes with an acceptable inter-coder reliability of 95%.

Part 2. Viewers' perspectives: An online survey. An online survey with a link to a VR design exhibition was conducted with a total of 63 students. Based on the designers' perspectives from the first phase, a VR gallery space was developed by 3D scanning four design artifacts that

included various materials and details, such as wool, cotton, textile prints, gathering, quilting, smocking, laser etching, and knitting. A poster showing the design processes and briefs was hung next to each design artifact. After the students' interacted with the VR design exhibition, they were asked to answer a series of closed- and open-ended questions about their experience. Categories and themes were identified in the qualitative data using constant comparison analysis (Corbin & Strauss, 2008). For the quantitative data, a confirmatory factor analysis (CFA) and a linear regression analysis were conducted to examine the students' use of the VR exhibition.

Results and Discussion. *Designers' perspectives.* An analysis of the qualitative data revealed that all of the students felt the VR exhibition was "innovative" and showed positive attitudes toward using the 3D VR exhibition to showcase their work. Students felt that they were "pioneers" in using a virtual platform due to the pandemic. They commented that the VR exhibition was "very innovative for the student level" and "it's the cutting edge of fashion; you see a lot of these VR fashion shows." This satisfaction extended to their e-portfolio development; they felt that they would be more competitive candidates in the job market and commented that it is "a great skill to have going into a new job, with how virtual and technical things are getting in the fashion industry lately." In the context of the current pandemic, the students perceived the virtual exhibition to be a "safe and comfortable alternative" and an effective supplementary tool for a live fashion show that was able to successfully promote interactions between designers and viewers. Students' responses to the representation of physical garments in terms of VR technology's ability to capture sheer materials (e.g., silk) and pastel colors were mixed, while most of the students were satisfied with the VR's representations of other colors and materials (e.g., cotton, leather).

Viewers' perspectives. About 77% of the students who took the online survey identified as female, with an average age of 22 years old, and a majority of the students were White/European American (50%) and Asian (36%), followed by Hispanic (7%) and African American (7%). About 36% of the students were graduate students, followed by freshmen (23%), juniors (19%), sophomores (15%), and seniors (7.5%). About 36% of the students indicated that they had past experiences using VR technology through gaming and VR headsets, such as Oculus and Google Cardboard. A confirmatory factor analysis using maximum likelihood estimation showed that the model provided an acceptable fit (CFA: $\chi^2 = 156.37$, $df = 71$, $p < 0.00$, CFI = 0.89, TLI = 0.88, and RMSEA = 0.09), and with the standardized factor loadings ranging from .85 to .99, convergent validity was satisfied (Hair et al., 2010). All of the constructs' Cronbach's alpha values ranged from .90 to .93, indicating acceptable internal consistency (Nunnally & Bernstein, 1994). A linear regression analysis found that U ($\beta = .30$, $t = 2.22$, $p < .05$) and EN ($\beta = .43$, $t = 3.07$, $p < .01$) had positive effects on AT. EU did not show significant effects on AT. A significant regression equation was found ($F [3,51] 12.56$, $p < .001$) with an R^2 of .43. Participants' predicted adoption of VR design exhibition technology is equal to $2.04 + .30(U) + .43(EN)$. Supporting the quantitative analysis, the content analysis of the open-ended questions showed that the students described their experience interacting with the VR exhibition as

“exciting,” “fun,” “unique,” and “eye-opening” and considered the VR exhibit to be a “a good supplement” when in-person activities are not possible. Most of the participants indicated that they were “impressed” with how realistic the designs looked in the 3D environment. One viewer noted, “I am really surprised how texture and design details could be accurately reproduced in the VR design exhibition.” The participants’ responses were mixed in terms of the navigation of the 3D environment; some considered it “easy to use,” while others stated it was “not intuitive to use,” supporting the statistically insignificant effect of EU on AD.

A VR exhibition is an effective channel for disseminating and promoting students’ visual work, enhancing social belonging, and encouraging interactions among students and industry professionals. The presentation of this study includes visual examples of a VR apparel design exhibition and effective strategies for disseminating students’ apparel artifacts through a 3D virtual platform.

References

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