

## Bridging the Digital Divide: Are Female College Students Struggle with Their Digital Competence at Technology-Integrated Fashion Curricula? Critical Case Study Approach

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**Introduction.** Digital competence has been integrated into diverse fashion professions, and the essential abilities are beyond digital technology application but involve the ability to engage in critical thinking and creative problem-solving by using diverse digital technologies (Oberländer et al., 2020; Sun et al., 2024). Contemporary fashion curricula have incorporated diverse digital technologies to equip students with the essential skills and knowledge to transition to professions (Kivunja, 2014). Notable examples include 3D Design Software, Microsoft 365, Adobe Creative Cloud, Canva, and Website Builder. These technologies are utilized in various fashion courses, including fashion digital presentation, retail and merchandising analysis, technical design, fashion data analytics, fashion merchandising, and marketing. However, the digital divide has become a significant concern for educators in the digital era (Gorski, 2005), particularly the increasing attention on the digital divide in online education after the COVID-19 pandemic (Van de Werfhorst et al., 2022). Numerous research studies have explored the digital divide across various high-technology usage disciplines (i.e., Stoilescu & McDougall, 2023) and have identified some factors that lead to the digital divide, including gender, geography, socioeconomic status, and digital literacy (Lythreathis et al., 2022). Particularly, previous studies highlighted sociocultural factors, including the presence of a gender divide that affects students' learning experiences (Stoilescu & McDougall, 2023). These studies presented that females struggle with their proficiency in technological competence and exhibited a lower level of digital competence compared to males (Jiménez-Hernández et al., 2020; Mishra et al., 2017). However, it remains uncertain whether a gender divide exists in our fashion courses, and the current state of knowledge is insufficient to understand how female college students perceive and engage with the technology they learn. Thus, this qualitative research study's primary objective is to investigate the digital divide's impact on students' learning experiences. Given this landscape, we formulated three research questions (RQs): RQ1: What are female college students' perceptions of digital competencies? RQ2: What are female college students' perceptions of the digital divide? RQ3: How do digital competencies interact with the digital divide that affects female college students' learning experience?

**Literature Review.** In order to achieve the goal of the study, we employed Bloom's digital taxonomy framework and multilevel digital divide framework as the main theoretical foundations. First, Bloom's digital taxonomy was revised and adapted to the issues in the digital world regarding digital competence (Churches, 2007). Churches (2007) have classified six levels of digital competencies within the framework from lower-order thinking skills to higher-order thinking skills, including (a) remembering, (b) understanding, (c) applying, (d) analyzing,

(e)evaluating, and (f) creating. Bloom’s digital taxonomy framework is crucial in shaping the design of curricula that incorporate digital competence and plays a significant role in exploring students’ learning experiences related to these digital abilities. Second, the concept of the digital divide pertains to the gaps and inequalities across demographic and cultural identity (Gorski, 2005). According to Van de Werfhorst et al. (2022), three-level digital divide frameworks are (a) access to digital technologies, (b) skills and usage of technology, and (c) effectiveness and outcomes of technology use.

**Methods.** A critical case study method was employed in this study because it allows for an in-depth examination of the case, capturing the complexity of the object of study, and aims to critically review the case, ultimately contributing to social change (Stake, 1995). Two technology-integrated online fashion courses (Digital Presentation and Digital Merchandising) were selected from a Mid-West comprehensive university. After approval from the Institutional Review Board (IRB), six female college students volunteered to participate in a 60-minute semi-structured interview from October 2023 to January 2024. Additionally, multiple forms of data, including interview transcripts, course syllabi, and course materials, were collected, imported, and coded using both inductive and deductive approaches through MAXQDA. Then, we utilized thematic analysis to focus on documenting participants’ experiences, meanings, and reality (Braun & Clarke, 2006). Multiple data and investigator-reviewed triangulation methods were used for reliability and validity (Golafshani, 2003).

**Results and Discussion.** Table 1 presents the coding scheme and examples. For RQ1 regarding digital competencies, participants focused on L2 understanding (22%) and L3 applying (25%), indicating that lower-order digital taxonomy was investigated for female college participants. For RQ2 regarding the digital divide, interestingly, female participants didn’t feel a gender divide exists in their learning experience, but a total of 64% digital divide was investigated in the second level of skills and usage. For RQ3, we did a two-way analysis in MAXQDA to investigate the interactions between participants’ digital competencies and the digital divide. Two themes were generated. Theme 1: “Social support,” including two sub-themes (a) social presence and (b) social justice, highlighted the importance of social interaction between instructors, technology, and students in their learning experiences, as well as revealed that implicit biases and social pressure might be a barrier to their learning. As one student stated, “I don’t feel gender difference, but I feel like that how people have implicit biases on this.” Theme 2: “Motivational goals,” including two sub-themes (a) career goal-oriented and (b) problem-solving-oriented, indicated the critical role of students’ motivation in learning these technologies. As one of the participants said, “I am motivated in the sense that I know it can help me a lot.”

**Implication.** This study contributes to the literature by extending digital competence and the digital divide in the realm of fashion discipline. The study reveals that much of the gender divide derives from implicit social pressure through the critical lens. It underscores the role of cultural expectations and stereotypes in shaping individuals’ digital skills. Moving forward, the study provides valuable insights for educators to provide effective social support and empower motivation interventions for bridging the digital divide to foster an inclusive learning environment and social change within the fashion field.

**Table 1.** Coding Themes, Scheme, and Examples

<i>Student - Bloom's Digital Taxonomy</i>	Rate (%)	Examples
L1: Remembering	13%	"familiar with the basic knowledge"
<b>L2: Understanding</b>	<b>22%</b>	"I got a good decent understanding of some of the software"
<b>L3: Applying</b>	<b>25%</b>	"I use adobe creative suit programs a lot"
L4: Analysing	6%	"I'm trying to think of specific tools to [help me with the problems]"
L5: Evaluating	19%	"I rely on googling solutions to search and check"
L6: Creating	16%	" I feel comfortable using it to create my flat sketches"
<i>Student - Digital Divide</i>	Rate (%)	Examples
<b>Level 1 Access</b>		
A1: Infrastructure divide	22%	"My high school was small, and we didn't have a lot of technology"
A2: Cost divide	7%	"We did have to pay for it, and it still charges me every month"
<b>Level 2 Skills and Usage</b>		
B1: Knowledge divide	50%	"I didn't fully feel like I got a good depth of knowledge with it, and I still don't really know how to work with it"
B2: Usage divide	14%	"I needed to use them routinely, otherwise I would forget them"
<b>Level 3: Effects and outcome</b>		
C1: Effects divide	7%	"I still think I have a pretty far way to go [effectively use], because I'm always confuse how do I get there"

\*Rate: The percentage of the specific coding themes among all themes identified in the study.

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