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A Novel TAM-Based Model for the Widespread Adoption of Fashion Pattern Construction Innovations (TAM-FPCIs)

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Abstract

This study developed the TAM-FPCIs Model by integrating the Technology Acceptance Model (TAM) with open LMSs, OERs, and instructional design theories to enable the widespread adoption of fashion pattern construction innovations (FPCIs). Using abductive reasoning and a developmental methodology, the model was informed by data from 78 UK-based FPC practitioners across five mixed-method research phases. The TAM-FPCIs Model offers a discipline-specific adaptation of TAM, providing a theoretical and methodological framework to support sustainable, scalable, and efficient FPCI adoption. As the first to extend TAM with open LMS delivery and pedagogical antecedents, it advances theoretical insight into the mechanisms underpinning innovation adoption in open educational contexts.

***Keywords**: Fashion Pattern Construction, Adoption Model, TAM-based, Educational Antecedents.*

1. Introduction

The fashion development process has become increasingly uncreative, inefficient, and unsustainable due to the obsolescence of traditional FPC methods and their outdated frameworks [1]. These legacy approaches perpetuate inefficiencies and fail to meet the demand for engineered, personalised garments [2]. Innovations in FPC technologies offer sustainable, efficient, and creative alternatives [3], yet their adoption remains limited [4]. While educators have sought to promote adoption to enrich sustainability, foster cognitive and technological skills, and cultivate creative design thinking [5]–[9], most efforts remain confined to teacher-led contexts with fewer homogeneous learners, neglecting approaches suitable for scalable non-homogeneous settings [4], [10]. This theoretical gap hinders the integration of innovative practices, allowing resource-intensive methods to persist [1], [4]. This study addresses this gap by developing the TAM-FPCIs Model, integrating TAM with open LMS-based OERs and instructional design theories to support widespread FPCI adoption and predict users' behavioural intentions to adopt.

2. Literature Review

2.1. The Five Studies for the TAM-FPCIs Model Development

The TAM-FPCIs Model was developed through five sequential studies spanning analysis, design, development, implementation, and evaluation phases. Each study examined the enablers, barriers, and mechanisms influencing FPCI adoption, using pattern parameterisation, a method for generating input-dynamic, output-responsive fashion patterns, as a representative case. Despite its longstanding presence in fashion systems, pattern parameterisation remains underutilised in both academia and industry [11], making it an apt lens for investigating adoption dynamics. The following subsections summarise each phase's aims, design, methodology, and key findings.

The Analysis Phase: This phase reviewed the literature on pattern parameterisation to establish its knowledge base and examine barriers to its adoption, despite its long-standing presence and proven benefits for sustainable, efficient fashion product development. Analysis of 85 studies revealed that the main barrier to large-scale adoption is the lack of generic conceptual and technical frameworks independent of specific technologies or contexts. For over three decades, this kept its knowledge largely tacit, confined to developers and a few early adopters, sustaining reliance on traditional methods. To address this, multidisciplinary engineering literature was reviewed, identifying key framework components: geometric data input, construction workspaces and processes, workflows, and outputs. Analysing these within the FPC context was essential to develop a generic, adaptable understanding suitable for any parametric CAD system.

The Design Phase: This phase established the pattern parameterisation frameworks by first identifying suitable development methods through an analysis of archival research. The review indicated that empirical comparative analysis, particularly the comparison of an innovation's conceptual and technical foundations with those of corresponding traditional methods, constitutes a commonly adopted, evidence-based approach for explicating tacit knowledge. The applicability of this method to FPCIs was then tested using pattern parameterisation as a case study. Four experimental blocks, sleeve, bodice, skirt, and trouser, were each drafted twice: once parametrically and once using traditional techniques. Selected for their geometric diversity and adaptability, these blocks enabled a systematic comparison of conceptual and technical differences, assessing impacts on efficiency, creativity, and sustainability. The resulting frameworks were intentionally generic, drawing on multidisciplinary engineering literature to inform their structure and terminology. Full methodological details are provided in Gill et al. (2023).

The Development Phase: This phase established methods to support the widespread adoption of the design-phase outputs. A review of the adoption literature identified two dissemination approaches: instructor-led and LMS-based OERs. The former proved inefficient and unsustainable, while the latter offered scalability, accessibility, and pedagogical effectiveness. Archival analysis revealed the absence of an instructional design model (IDM) suited to developing open LMS-based OERs for FPCIs. In response, the study introduced the OER-PattEdu Model, integrating TAM, originally formulated by Davis et al. (1989), due to its wide employment to examine user acceptance of FPCIs. The model embedded Constructive and Experiential Learning to enhance perceived usefulness (PU) and incorporated Multimedia, Bite-Sized, Scaffolded Learning, and Concept Mapping to support perceived ease of use (PEOU). These theories were operationalised as instructional procedures for designing, piloting, and delivering OERs. Full details are provided in Al Houf et al. (2024).

The Implementation Phase: This phase operationalised the OER-PattEdu Model through the development of PatternInstruction, an open LMS-based OER embedding pattern parameterisation as an FPCI exemplar. Following the model's stages and procedural activities, a pilot study, ethically approved by the University of Manchester, evaluated usability and theoretical impact on adoption. Thirty-eight UK practitioners engaged via a post-learning Likert survey and semi-structured interviews. Findings affirmed the model's effectiveness in guiding adoption tools development. The embedded theories notably enhanced PEOU and PU, positively influencing behavioural intentions to replace traditional methods.

The Evaluation Phase: This phase established evaluation methods for behavioural intention to adopt FPCIs through archival research, identifying the suitability of scaled pre-/post-intervention tests and post-open-ended questions within PatternInstruction. Quantitative data were analysed using paired t-tests; qualitative responses underwent thematic analysis. Kirkpatrick's four-level framework, reaction, learning, behaviour, and results, was adopted for comprehensive evaluation. Ethical approval was obtained from the University of Manchester. A convenience sample of 40 UK pattern construction practitioners, selected via Cochran's formula, participated. Findings indicated a positive behavioural shift towards adopting pattern parameterisation over traditional methods. Full details are in Conlon et al. (2024).

2.2. Adoption Models Development

Adoption models offer structured frameworks to conceptualise and analyse innovation adoption, enabling systematic identification of key stages, factors, and impacts [13],[14]. A review of relevant literature revealed that development methods differ based on model type, conceptual or numerical [13]. Conceptual models are theoretical, often qualitative, frameworks explaining how individuals become aware of, understand, and decide to adopt innovations[13]. Derived from existing theories, they guide domain-specific research through surveys, interviews, or case studies and are typically represented diagrammatically to illustrate influential factors and relationships without quantification. Numerical models, often extensions of conceptual ones, quantify the influence of variables using statistical methods such as mean comparisons or structural equation modelling [15]. The review affirmed that no single model can fully capture the adoption process, given its complexity and context dependence. This highlights the need for diverse models tailored to specific contexts and scales[13]. The TAM-FPCIs Model contributes a conceptual framework specific to FPC, addressing a notable gap at the intersection of open education, innovation adoption, and FPC.

3. Methodology

This study adopted an abductive reasoning developmental approach to develop the TAM-FPCIs Model. Abductive reasoning uses critical inferential reasoning to provide the best possible explanation for a phenomenon [16]. It enabled parallel engagement with findings from five studies and established theories, providing a robust foundation for the model. The studies building the TAM-FPCIs Model were conducted between January 2022 and August 2024, involving 78 UK-based pattern construction practitioners from 15 academic backgrounds and varying experience levels. Data collection employed mixed methods (Section 3.1), using a multi-phased approach to triangulate findings and capture diverse perspectives, thus minimising bias. To enhance validity and rigour, data were cross-validated against existing empirical studies. The methodology for mapping constructs, antecedents, and their interrelationships, and heuristically evaluating their contributions, followed established multidisciplinary approaches for developing TAM-based adoption models[17]–[20].

4. Findings and Discussion

This section presents the TAM-FPCIs Model (**Fig. *1***), developed to predict and explain FPCIs adoption. It posits that embedding generic frameworks into theoretically grounded open LMS-based OERs can promote scalable, efficient, and sustainable adoption across FPC communities. The model comprises three components. The first, the *external variable*, involves developing generic frameworks that initiate the adoption process. The second is the *instructional design process*, wherein these frameworks are converted into pedagogical content and delivered through open LMS-based OERs. This process is informed by two sets of educational theories. Theories enhancing PU include constructivist and experiential learning, while those enhancing *perceived* PEOU include bite-sized learning, scaffolding, multimedia learning, and concept mapping. The order of antecedents within each category is non-hierarchical.PU and PEOU collectively influence *behavioural intention*, the principal predictor of actual use. The subsections below define each construct, summarise their documented contributions to innovation adoption, and report their validation across the five prior phases.

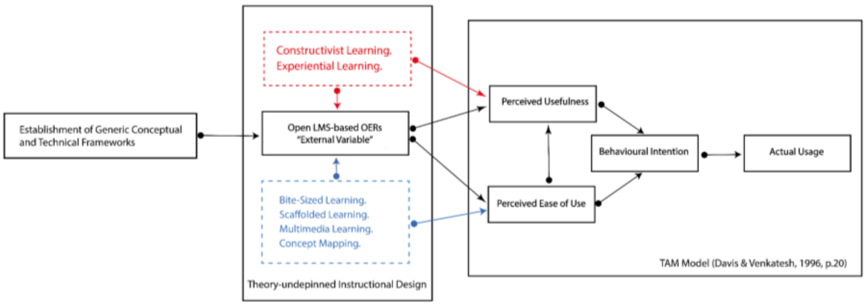

Fig. 1. The TAM-FPCIs Model

4.1. The Establishment of Generic Conceptual and Technical Frameworks

The first variable in the TAM-FPCIs Model is the establishment of generic conceptual and technical frameworks. These frameworks encompass the innovation's scientific theories and technical principles, independent of specific technologies or contexts[11]. Conceptual frameworks organise and synthesise the innovations' core theories to provide a coherent foundation, while technical frameworks define operational processes and standards for practical implementation [4], [11]. Developing generalisable, decontextualised frameworks is crucial for long-term use and widespread adoption, as they articulate foundational principles that ensure adaptability across professional domains and separate theoretical knowledge from context-specific practice, a key barrier to adoption [21]–[29].

The systematic review conducted during the Analysis to identify factors contributing to the limited adoption of pattern parameterisation despite its longstanding operational presence [30] revealed the absence of such frameworks in pattern parameterisation, unlike other fields. Existing knowledge remained context-specific, creating inconsistent understanding and hindering transferability across domains like textiles, fashion design, and system development. The Evaluation Phase further validated their importance. Frameworks developed in the Design Phase and embedded in an educational tool in the Implementation phase engaged forty UK-based practitioners from over fifteen academic backgrounds, enhancing behavioural intention to adopt pattern parameterisation. Participants successfully adapted the frameworks to their professional contexts, including fashion design, computer science, and textile engineering, facilitating broader adoption. Thus, establishing generic conceptual and technical frameworks is indispensable, justifying its role as the TAM-FPCIs Model's first variable.

4.2. Open LMS-Based OERs: "The External Variable"

Open LMS-based OERs form the second variable in the TAM-FPCIs Model. These freely accessible modules embed both theoretical and technical FPCI frameworks and are hosted on open LMS platforms to support lifelong learning, allowing practitioners to engage with innovations independently, regardless of financial or geographical barriers[1], [4]. As an external variable, open LMS-based OERs influence behavioural intentions by embedding conceptual and technical frameworks, offering practitioners structured, accessible engagement with innovations. Their selection is supported by empirical evidence of their sustainability, efficiency, and effectiveness in large-scale adoption [31]. Research confirms that open LMS-based OERs lower human and financial costs while surpassing trainer-led methods in effectiveness due to their interactive, learner-centred, and experiential design [31]. These features immerse learners in real-world scenarios, promoting the independent application of innovations, crucial for keeping pace with the evolving fashion industry and academia [4], [32]. The development phase validated their sustainability, pedagogical effectiveness, and efficiency. Comparative analysis showed open LMS-based OERs require fewer resources and deliver higher learning quality than trainer-led approaches. Further validation occurred in the Evaluation and Implementation Phases, where seventy-eight UK practitioners from over fifteen disciplines engaged asynchronously with PatternInstruction at no cost. Through real-world projects, participants applied pattern parameterisation to solve professional problems, recognising its relevance within their contexts. Post-learning assessments demonstrated that participants' conceptual and technical achievements clustered around the mean, indicating the geological effectiveness of open LMS-based OERs and their ability to address academic and proficiency diversity. This inclusive environment reflects the fashion industry's heterogeneity, where varied backgrounds intersect. Academic performance, attitudinal responses, and professional reflections confirmed the effectiveness of open LMS-based OERs in fostering FPCI adoption.

4.3. Perceived Usefulness

PU represents the first internal belief within the TAM-FPCIs Model that influences users' behavioural intentions towards adopting FPCIs. PU refers to the extent to which end users believe that employing an innovation will enhance their job performance [12]. Within the TAM-FPCIs Model, PU is shaped by three instructional antecedents: constructivist learning and experiential learning,(Fig. ***1***). These empirically supported strategies enhance PU and promote widespread adoption. The following sections examine each antecedent's role in increasing PU.

4.3.1. Constructivist Learning

Within the TAM-FPCIs Model, constructivist learning constitutes the first antecedent of PU. In the context of adoption enhancement, constructivist learning refers to learners' active construction and personalisation of novel knowledge derived from their learning experiences based on their prior knowledge [33]. Its role as a key driver of PU has been empirically confirmed in recent studies on educational innovation adoption [15], [27], [34]. These studies underlined the interpretive nature of constructivist learning, asserting that learning is adaptive and shaped by prior knowledge, lived experience, and contextual factors. Knowledge, from this perspective, is not fixed but subjectively and contextually constructed. These studies also found that Constructivist learning promotes active engagement with innovations through real-world, problem-based tasks aligned with disciplinary and professional needs. This approach makes abstract or unfamiliar innovations more accessible and personally relevant while highlighting their relative advantages over existing practices. Evidence from innovation adoption research suggests that when learners perceive innovations as superior to current alternatives, they are more likely to develop positive attitudes toward adoption[35]–[39]. The significance of constructivist learning in enhancing PU was substantiated during the development phase. It was identified as a principal learning theory that should underpin the design of open LMS-based OERs for disseminating emerging FPCIs, owing to its demonstrated advantages in increasing PU. The implementation and evaluation phases further substantiated the role of constructivist learning in enhancing learners' PU of pattern parameterisation. Participants reported that engaging with pattern parameterisation through real-world, constructivist learning experiences, specifically generating two parametrised skirt patterns from concept to completion while comparing them with traditional frameworks, facilitated meaningful interaction with the innovation. This process enabled them to draw upon their prior professional knowledge to adapt pattern parameterisation to their specific contexts, including textile engineering, fashion design, and pattern construction. Moreover, contrasting it with existing methods enhanced its relevance to their current practices and revealed its potential to modernise them, particularly in improving pattern fit experimentation and automating size and design variations.

4.3.2. Experiential Learning

Experiential learning represents the second antecedent of PU within the TAM-FPCIs Model. It entails hands-on engagement that allows learners to interact directly with the innovation [40], [41].

This theory has been widely integrated into existing adoption models to enhance perceptions of PU by offering authentic, problem-based experiences that merge theory with practice [41]–[44]. Such integration strengthens learners' conceptual grasp of the innovation frameworks, enhances PU, and increases the learning relevance to traditional practices [45]. Experiential learning also facilitates the development of essential 21st-century skills, including critical thinking, digital literacy, and problem-solving, by presenting learners with real-world challenges and equipping them with tools to generate effective solutions [41], [46], [47]. These competencies are essential not only for adopting innovations but also for critically evaluating and resolving complex product engineering issues [40], [41], [48].

The role of experiential learning in enhancing users' PU of FPCIs was affirmed during the development phase through the literature review of educational theories supporting their adoption. This review identified experiential learning as a particularly effective strategy for facilitating the acquisition, contextualisation, retention, and real-world transfer of novel knowledge, the aim of developing open LMS-based OERs to diffuse emerging FPCIs. It also highlighted experiential learning's capacity to meet the motor domain demands of FPCI learning, which require repetitive practice to master innovation frameworks and integrate them into established FPC practices. Such practice is widely recognised as vital for bridging the theory-practice gap, a persistent barrier to effective understanding and engagement with innovations. Addressing this gap is critical to realising the full potential of FPCIs and advancing their adoption. The implementation and evaluation phases corroborated the literature review by providing empirical evidence from learners' perspectives on the effectiveness of experiential learning in understanding pattern parameterisation frameworks, their practical application, and their relevance within professional contexts. Participants reported that engaging in meaningful, hands-on activities deepened their comprehension of the principles and professional significance of pattern parameterisation. They further recognised its applicability across disciplines such as fashion design, textile engineering, computer science, fashion technology, and pattern construction, emphasising its potential to enhance current practices and address existing limitations.

4.4. Perceived Ease of Use (PEOU)

reflects users' beliefs about how easy it is to learn and apply FPCIs. It significantly shapes adoption attitudes and enhances PU by reducing cognitive load and perceived effort, key barriers to engagement. Lowering these barriers increases users' willingness to adopt and integrate innovations into practice. In the TAM-FPCIs Model, PEOU is driven by instructional antecedents embedded within the open LMS-based OERs Fig. ***1***). The next sections detail these antecedents and their contributions to facilitating FPCI adoption.

4.4.1. Bite-Sized Learning

In the TAM-FPCIs Model, bite-sized learning is the first antecedent of PEOU. It segments an innovation's frameworks into concise, focused units, each addressing a specific component[1], reducing extraneous cognitive load, a key barrier in technology-assisted learning [49]. Extraneous load overwhelms working memory, impeding learning and adoption[49]. Minimising such load preserves cognitive resources, enabling higher-order processes such as analysis, comparison, and synthesis into existing schemata [50]. This supports engagement and long-term knowledge retention, essential for adoption[1]. Its importance as a PEOU antecedent was first confirmed during the development phase through critical analysis of theories and instructional strategies for FPCI adoption. This review highlighted its value in easing cognitive overload and managing pattern construction's complexity. Further empirical support emerged in the Evaluation and Implementation Phases. Qualitative data from two participant cohorts who studied pattern parameterisation via bite-sized units consistently reported easy learning, and improved comprehension, and application, without cognitive fatigue or frustration.

4.4.2. Scaffolding Learning

This instructional approach supports learners in building expertise through structured guidance that helps integrate new knowledge into existing cognitive frameworks[1]. Scaffolding enables learners to progressively acquire innovation-related knowledge and complete tasks that would be challenging without external support[51]. It enhances comprehension of both the content and the rationale behind tasks, rendering outcomes more intelligible and justified [51]. This also facilitates acquiring, connecting, and integrating new knowledge with pre-existing schemata, resulting in their revision and advancement [51]. The design phase confirmed scaffolding's value in supporting FPCI adoption. Analyses of methods for codifying pattern parameterisation frameworks validated scaffolding as effective for progressively exploring concepts, from foundational knowledge to full problem-solving projects. This approach connected parameterisation frameworks to existing pattern construction schemata via comparative analysis, clarifying distinctions between traditional and parameterisation-based practices, thus reinforcing parameterisation's capacity to enhance current methods. In the development phase, a review of relevant learning theories confirmed widespread agreement on scaffolding's effectiveness in improving PEOU, solidifying its role as a key antecedent. Further empirical evidence from the evaluation and implementation phases substantiated its impact. Quantitative measures of participants' conceptual and technical achievements showed an improved understanding of parameterisation frameworks, with post-instruction scores clustering around the mean. This indicates scaffolding's role in narrowing performance disparities across participants with varied educational, professional, and proficiency backgrounds, underscoring its inclusivity in facilitating adoption. Qualitative data consistently affirmed the value of scaffolding. Participants reported that the structured progression, anchored in prior knowledge and supported by comparisons with existing understanding, demystified pattern parameterisation principles. This not only simplified conceptualisation but also enhanced participants' ability to apply these principles to advance existing pattern construction practices.

4.4.3. Multimedia Learning

Multimedia learning involves digitising innovation frameworks into various formats, such as videos, texts, and audio, to facilitate knowledge acquisition and mastering [52]. Its role in enhancing PEOU is twofold. First, multimedia learning improves comprehension and long-term retention by engaging both auditory and visual processing channels [49]. This dual-channel integration reduces complexity, enabling learners to construct coherent mental models, thereby improving engagement, understanding, and memory optimisation [53]. Simultaneously, it lowers the extraneous cognitive load and optimises working memory, supporting efficient learning and facilitating the transfer of knowledge to long-term memory [49]. These effects positively influence learner attitudes and increase the likelihood of innovation adoption[1]. Second, multimedia learning accommodates diverse learning styles (visual, auditory, and kinaesthetic) resulting in a more dynamic, inclusive, and effective learning experience[54]. This is particularly vital in FPCI adoption, where a mismatch between learners' styles and instructional formats has been identified as a barrier [1], [55]. Addressing this mismatch improves comprehension, achievement, and behavioural intention to adopt [1], [56], solidifying multimedia learning as a critical antecedent of PEOU.

Its significance was evidenced in the development phase, where multimedia learning was identified as essential for enabling comprehension and adoption through OERs, particularly given the diverse preferences of pattern-construction learners. It was also recognised as an effective solution to the limitations of one-format digitisation approaches. During implementation, participants consistently reported that learning through the multimodal PatternInstruction substantially facilitated their understanding of parameterisation frameworks despite their complexity. This impact was further corroborated in the evaluation phase. A mixed-methods analysis of participants' behavioural intentions to adopt pattern parameterisation confirmed that multimedia learning significantly shaped adoption across professional, behavioural, learning, and attitudinal levels, reinforcing its foundational role in the TAM-FPCIs Model.

4.4.4. Concept Mapping

Concept mapping is the fourth and final antecedent of PEOU in the TAM-FPCIs Model. It entails visually representing the innovation's conceptual and technical frameworks by hierarchically arranging their components and indicating interrelationships through labelled arrows (e.g., "starts," "leads to," "requires")[57]. This approach offers a succinct and accessible overview of complex innovations, thereby enhancing their PEOU. Concept mapping reduces the complexity of innovations' frameworks and simplifies the intricate interconnections among their components by visually consolidating their multi-dimensional interactions into a single accessible and interactive graphic [57]. Without the use of concept mapping, these intricate interconnections can be confusing and overwhelming for learners. This approach, therefore, reduces cognitive load and supports knowledge acquisition, integration, and retrieval [58], all of which contribute to learners' willingness to adopt the innovation.

The role of concept mapping in enhancing PEOU was evident throughout the development phase where concept mapping was identified as an essential instructional strategy for reducing the abstraction of pattern parameterisation frameworks and improving their comprehensibility. In the implementation phase, participants consistently reported that concept maps provided a navigable and coherent structure for mastering core principles, enhancing both comprehension and practical application. Empirical findings from the evaluation phase further substantiated this conclusion. Data indicated that learners were able to grasp complex concepts, their components, and hierarchical relationships effectively through concept mapping, despite the innovation's novelty.

4.5. Behavioural Intention to Use

In the TAM-FPCIs Model, behavioural intention bridges enhanced perceptions of usefulness and ease of use with actual use, reflecting users' readiness to adopt FPCIs in current and future practice. It serves as the immediate predictor of actual use. This intention was evidenced during both the implementation and evaluation phases. In the implementation phase, although not explicitly measured, participant feedback indicated that the embedded generic frameworks and instructional design strategies successfully enhanced PU and PEOU, fostering readiness to integrate pattern parameterisation into professional workflows. In the evaluation phase, mixed-method data further confirmed strong behavioural intention across all adoption levels, with participants expressing a clear willingness to apply pattern parameterisation in both current practice and future professional development.

4.6. Actual Use

In the TAM-FPCIs Model, actual use represents the final outcome of the adoption process, reflecting learners' integration of the innovation into their professional routines [59]. While the actual use of FPCIs, specifically pattern parameterisation, was not directly measured in the five-phase studies (Section 2.1. it was inferred from the formation of behavioural intention, consistent with established literature[60], [61].

5. Conclusion, Contributions, and Implications

Technological advancements in FPC offer solutions to longstanding limitations, enhancing sustainability, efficiency, and creativity. However, effective large-scale adoption remains theoretically underexplored. Addressing this gap, the TAM-FPCIs Model integrates TAM with open education and instructional design theories to provide a structured framework for examining adoption and predicting behavioural intentions. As the first TAM extension tailored to FPC, the model introduces discipline-specific mechanisms, positioning open LMS-based OERs as external variables and embedding instructional theories as antecedents to PU and PEOU. Developed and validated through five interlinked studies, it is the first empirically grounded framework guiding FPCI adoption. While each study offers standalone contributions, their synthesis (Section 2.1.) presents a cohesive theoretical process for systematic FPCI adoption. Methodologically, the model exemplifies innovation in adoption model design, employing diverse approaches, design-based research, empirical analysis, instructional design evaluation, and mixed-methods assessment, to form a transferable research framework. Practically, the model provides actionable strategies for integrating innovation into education and practice, supporting scalable and sustainable adoption. Grounded in validated theory, it holds broad applicability across FPC and related fields, contributing to the digital transformation of fashion education and practice.

6. Limitations and Recommendations

This study presents several limitations that offer avenues for future research. First, grounding the model solely in TAM may exclude factors such as social or organisational influences; integrating frameworks like UTAUT or Diffusion of Innovations could enrich its scope. Second, while methodologically sound, the sample of 78 UK-based FPC practitioners may limit generalisability. Broader, more diverse samples across educational and professional contexts are recommended. Third, validation focused on a single FPCI, pattern parameterisation, which may not represent the adoption of other innovations. Future studies should apply the model to diverse FPCIs to test its adaptability. Lastly, the UK-specific context may not capture cross-cultural variations in adoption. International studies are needed to assess the model's transferability across different institutional and cultural settings.

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