Blok-Shoppe: Documented design of an apparel gamified module for occupational experience with Adobe Illustrator

Hixson, S. W. & Eike, R.

Adobe Illustrator | Competencies | Computer-aided Design | Inclusion | Pedagogy | Technology

This study presents the instructional design process and outcomes of a needs-centered, accessible, inclusive gamified module guided by self-determination theory and design thinking designed to engage students in apparel curriculum. The study employs modified usage of the IDEO toolkit and design documentation. The primary objectives of the research were to document the design process of a Adobe Illustrator module and to provide a ready-to-use but modifiable game which may be utilized and evaluated within computer-aided design courses. Outcomes are of interest to educators interested in instructional design of accessible and competency-based

learning experiences for their students as well as instructional designers interested in self-determination theory.

Introduction

Apparel and textiles curriculum is unique in that course designers are often apparel designers themselves. Bye (2010) discussed how the intersection of apparel design skills and instructional design skills is advantageous for apparel researchers focused on the scholarship of teaching and learning. Bye (2010) suggests exploring course design through the lens of creative design skill can be recorded and disseminated as design research. The validity and rigor of design documentation as a research method as communicated via proceedings of design scholarship and the means through which a researcher may incorporate the process of design research are well-established (Pedgley, 2007) and increasingly valued amongst academic apparel and textile design scholars (Black & Cloud, 2009; Haar & Bye, 2021; Lee et al., 2021).

Design research in apparel and textiles critically informs garment and clothing design processes through systematic investigation, creative expression, and a focus on innovation and theoretical applications, contributing to a large body of scholarly knowledge related to dress (International Textile and Apparel Association, n.d.). Similar to the process documentation by apparel and textile design scholars, instructional design through evidence-based practice, such as self-determination theory (SDT), has emerged as a field which centers design documentation as a research method (Sweller, 2021). The convergence of design documentation in apparel and instructional design for apparel is an unexplored but highly compatible connection and opportunity for apparel pedagogy research. Many apparel educators in higher education are not required to complete instructional design training but are instead trained as content matter experts in the discipline of apparel (Wright et al., 2002). Therefore, presenting a method for applying the design thinking they know as apparel designers to develop learning experiences beyond what they encountered as students is critical to establishing the proposed connection between instructional design and apparel educator skillsets. This connection between instructional design and apparel educator skillsets can foster cross-disciplinary collaborations which explore the application of instructional design in different fields, creating an opportunity for apparel educators to expand their impact beyond apparel education. Additionally, it creates opportunities for iterative improvement within the apparel curriculum by integrating instructional design principles, ultimately enhancing the learning experiences and outcomes for apparel students.

Current apparel pedagogy and curriculum development provides students with opportunities for skill acquisition which revolves around occupation and industry-specific proficiencies

(Eike et al., 2018; Jacobs & Karpova, 2019; Karpova et al., 2011; Welters & Marcketti, 2015). Some examples include service-learning, which connects student learning to community building and strengthening (Banerjee & Hausafus, 2007); study tours or excursions, which immerse students in cultural centers and industry hubs (Porth, 1997); and internships, which place students temporarily into industry roles to build experience (Kozar & Hiller Connell, 2015). Apparel students need these experiences to best prepare them for their future careers, but the challenges of travel and low or unpaid internship marginalize some students, such as those with financial and ability barriers (Bettencourt, 2020; Cho et al., 2021; Kelley et al., 2016; Senat et al., 2020). Therefore, an option which is broadly accessible to all apparel students and provides occupation and industry-specific proficiencies (e.g., the ability to design technical sketches) is needed. One such option utilized by many other disciplines is role-based gamified scenarios, similar to standardized patient clinics in the medical field and mock trials for law students. The term "gamification" refers to the application of game elements and principles in non-game contexts, such as education, to enhance engagement and motivation. Despite the proven efficacy of these approaches (i.e., role-based gamified scenarios) and the definitive parallels between apparel and such pre-professional, skill-focused disciplines, no such practice has yet been uniformly established for the apparel field. Apparel education is appropriately positioned to embrace a gamified module design, a format similar to a mock trial or standardized clinic, to professionally prepare students for career success in the apparel industry. As with design thinking, SDT has emerged as a helpful framework for creating engaging gamified educational experiences (Kam & Umar, 2018).

This study presents the development process and outcomes of a gamified module designed to meet the needs of apparel students, incorporating principles from SDT and design thinking. This study generated a game design document, i.e., an outline of the structure and mechanics of the gamified module, through a modified application of the IDEO toolkit, an instructional design guide including analysis and interpretation of data derived from reflections and experiences. Thus the study provides a) design documentation for the formulation of an apparel product development module and b) a ready-to-use, modifiable game, suitable for dissemination and evaluation within apparel classrooms utilizing Adobe Illustrator or similar computer-based design software. The primary objective was to investigate the design of a role-based gamified scenario (referred to as eduLARP, educational live action roleplay) for apparel students, informed by SDT and principles of game and instructional design.

Theoretical Background

Self-determination theory (SDT)

Self-determination theory (SDT) is a meta-theory that explains how individuals are motivated in task-oriented settings (Ryan & Deci, 2000). SDT emphasizes crucial factors in designing engaging and effective educational experiences and enhancing students' motivation and engagement with the course material. One sub-theory, known as cognitive evaluation theory, details how and why different types of motivations can be facilitated by the satisfaction of basic psychological needs (Deci & Ryan, 1985). The level to which these needs - autonomy,

competence, and relatedness - are met influences an individual's motivation to complete a given task. Autonomy describes the sense that one's decisions are one's own (i.e. self-determined) (Vansteenkiste et al., 2020). Competence is one's ability, and self-efficacy, to complete a given task (Vansteenkiste et al., 2020). Feelings of relatedness are synonymous with a sense of belonging (Simkins, 2014).

Educators can avoid thwarting intrinsic motivation while creating environments to support extrinsic motivation through practices which fulfill students' basic psychological needs. While intrinsic motivation is innate and cannot be created for an individual through external pressure, extrinsic motivation can be supported in such a way that the benefits and outcomes are nearly indistinguishable from intrinsic motivation (Deci et al., 1991; Deci & Ryan, 2000; Ryan & Deci, 2000). Researchers and practitioners in education employ SDT because students are completing tasks through external pressure, but the motivation to complete these tasks can be intrinsic as well as extrinsic (Deci et al., 1991). The benefits of self-determined extrinsic motivation in the context of the educational domain are very similar to the benefits of intrinsic motivation (Niemiec & Ryan, 2009). However, unlike intrinsic motivation, self-determined motivation can be fostered in students who do not have inherent interest in a topic, such as technical sketching, using vector art software, or documenting their design process.

Self-determined motivation to complete tasks provides students with greater conceptual understanding of content and elevated creativity (Deci & Ryan, 2000; Vansteenkiste et al., 2020). Therefore, instructional design grounded in SDT can create a learning environment in which students motivate themselves (Niemiec & Ryan, 2009; Reeve & Cheon, 2021). An educator teaching from a SDT lens may do so by providing rationale for content, involvement in decision-making for the course, and positive, meaningful feedback without competition, deadlines, or rewards (like prizes) (Reeve & Cheon, 2021). These practices support relatedness and competence without thwarting autonomy. Most importantly, SDT grounded classrooms and instructional design centers student needs. In apparel and textiles courses, apparel student needs tend to focus on industry-specific skillsets, leading to RQ1: How might apparel educators create a competency-specific learning module to fulfill student psychological needs?

Apparel student needed skillsets

The set of skills apparel and textiles educators provide students include those which support product development within the apparel supply chain, so that even students who do not go into product development can work effectively within cross-functional teams (Danielson, 1986; Feori-Payne & McKinney, 2022; Romeo & Lee, 2013). Jacobs and Karpova (2019) outlined apparel skill needs for students in apparel and textiles disciplines based on a meta-analysis of literature resulting in the apparel merchandising competency (AMC) framework. The titular 'merchandising' concepts were only one facet of the framework, with skills needed for design and product development also included. Critical thinking, creativity, collaboration, and technical skills were among the most important to include in apparel curriculum.

Creativity is the most essential skill and expands across all career paths in apparel (Bukantaitė & Sederevičiūtė-Pačiauskienė, 2021). Developing creativity as a skill is a process

that involves performing idea generation followed by application (Peterson & Pattie, 2022). An example of this would be learning Adobe Illustrator and creating a technical sketch within the software. Adobe Illustrator is the vector art application within the Adobe Creative Cloud application suite. Its prominence throughout the apparel industry positions proficiency in the software as a key learning outcome in apparel educational programs. Additionally, skills in Adobe Illustrator prepare students for more complex software in product development, including industry-leading cross-functional team design software like Browzwear, Lectra, Backbone, Gerber, and Optitex (Browzwear, 2022; Gill, 2015). Creativity and technical design skills, as measured through original design output and complex application of tool competency, benefit apparel students regardless of their career goals as both build their overall competency as apparel professionals. Therefore, they need to have targeted coursework (i.e., thoughtfully crafted learning opportunities) to develop and master these creative and technical skills.

Apparel students can demonstrate evidence of acquiring these creative and technical design skills through the generation of technical sketches. Technical sketches, also known as 'tech sketches' or 'flats', are "detailed vector drawings of any product that goes into production and are important to every part of the apparel and textiles industry supply chain" (Szkutnicka, 2010, p. 32). Tech sketches are relevant to a wide range of student career goals and content interests. The production and conceptualization of tech sketches is therefore useful for all apparel students. In order to grasp these concepts surrounding technical sketches, such as how to create them and why they are necessary, students must be motivated to learn (Ames, 1992; Deci & Ryan, 2000; Wang & Eccles, 2013). Adobe Illustrator skills and creativity are essential for apparel students, and they are skills that must be taught and acquired through practice (Bukantaitė & Sederevičiūtė-Pačiauskienė, 2021; Jacobs & Karpova, 2019). A student's motivation to learn these skills is key to their success in the classroom as well as in the industry upon graduation.

Apparel educator considerations

Learning design skills fulfills professional needs and can simultaneously fulfill other essential cognitive needs which lead to deeper thinking and learning (Hay et al., 2020; Lyke & Young, 2006). Latent learning outcomes in skills like critical thinking and decision-making (Conlon, 2022), spatial reasoning (Hodges et al., 2020), and metacognition (Yu, 2021), demonstrate these cognitive needs are being fulfilled. While these skills fall within the AMC framework, they also align with expected learning outcomes when a learner is self-determined in their motivation (Liu et al., 2009; Ryan & Deci, 2000). As such, these outcomes are more accessible for students in a classroom guided by SDT. The educator creating this environment can utilize design thinking to center student needs and solve complex problems.

Providing students with targeted coursework and creating a self-determined learning environment can increase their motivation to learn and ultimately lead to their success in the industry. It is important to recognize every student learns differently and has unique needs, especially in the context of design education (Eder & Hubka, 2005). When teaching design skills to apparel students, it is important to have a curriculum which considers diverse learning needs and prioritizes accessibility from cognitive, physical, and financial perspectives (Rose et al., 2005). Therefore, in the present study, accessibility means

ensuring all students have access to meaningful, industry and skill-centered learning opportunities. Design skills are important for apparel students as they fulfill not only their professional needs, but also their cognitive needs, such as critical thinking, decision-making, spatial reasoning, and metacognition (Kirsh, 2004). This underscores the importance of creating accessible learning opportunities for all students, regardless of their career goals, content interests, or financial means to participate in other experiential activities (i.e., study excursions or internships). Ultimately, it is essential to equip students with the necessary skills and tools, such as Adobe Illustrator, to succeed in the industry and become competent apparel professionals. To address this need, the researchers investigated RQ2: How can an apparel module be designed to offer occupational experiences in a more accessible setting?

Design thinking and documented design

SDT specifies the benefits of fulfilling student needs. Apparel student needs include basic psychological needs as well as the need for occupational skillsets. Design thinking provides a path to fulfilling these needs. Design thinking involves experimentation, prototyping, and redesigning based on feedback (Razzouk & Shute, 2012). Freedom to explore and fail builds autonomy, a flexible structure facilitates feelings of competence without thwarting autonomy, and the focus on positive, constructive feedback is aligned with relatedness-supportive practice (Reeve & Cheon, 2021). For these reasons, an educator who is designing instruction for apparel students will likely find success with SDT guided approaches (Mylrea et al., 2017; Rayburn et al., 2018; Zhao et al., 2021). Students in apparel need volition over what they learn, relatedness to others, and skill competence according to SDT. Design thinking can be useful for creating impactful content for students in line with SDT. The design thinking approach parallels documented design research methodology found in the apparel and textiles field.

Studies in apparel with documented design in the research methodology frameworks frequently incorporate reflection, conceptual explanation, and contextual analysis (Alhussein & Hadjileontiadis, 2022; Falessi et al., 2006; Lytra et al., 2012). Design documentation is highly compatible with these qualitative methods and goals (Sadokierski, 2020). Starkey et al. (2021) incorporated a longitudinal qualitative study which included student perceptions before, during, and after an intervention where the students used virtual reality (VR) to inspire garment design. The study provides an example of developing and analyzing a new technology curriculum for apparel. The researchers emphasized that documentation and reflection were essential for student learning as well as analysis for their study. Binhajib et al. (2022) examined VR in the design process, focusing on the potential use of VR technology in enhancing the design sketching phase. The study shows how, by incorporating new tools and techniques into the design process, designers can improve their ability to document and communicate their ideas, as well as collaborate with others more effectively. Designers' abilities to document and communicate their ideas influences how they create more thoughtful and innovative solutions which meet the design challenge goals. This can be applied to pedagogical techniques in apparel as well.

The intersection between motivation, supported by SDT, and competency, as defined by AMC, produces students who are highly motivated for developing their skills and knowledge. The intersection between motivation and accessibility creates an environment which supports and encourages student motivation, while the intersection between accessibility

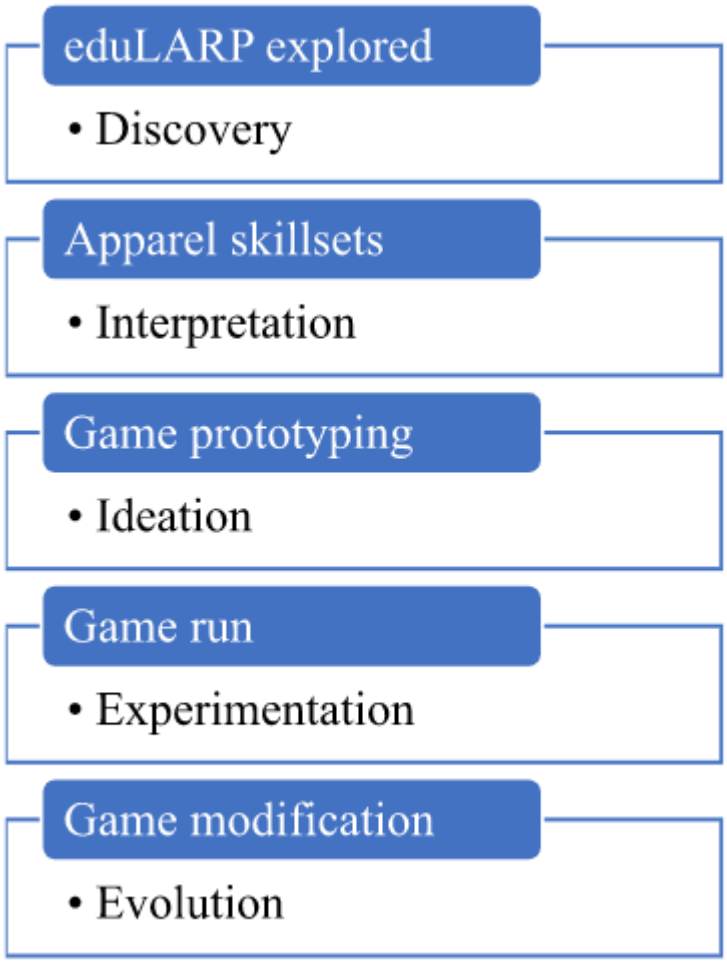
and competency reflects the importance of creating inclusive learning opportunities accessible to all students. The intersection of all three concepts represents an ideal learning environment, where students are highly motivated, develop their skills and knowledge, and have access to inclusive learning opportunities. Design thinking offers a human-centered approach to creating accessible curriculum which aligns with the principles of SDT and the competencies outlined in the AMC framework, and therefore can be used to guide the generation of an apparel module that fits within the ideal learning environment. To explore this potential, researchers asked RQ3: How can design thinking be used to create an accessible and competency-based curriculum for apparel students that aligns with the principles of SDT?

Design Process

The IDEO Design Thinking for Educators Toolkit (2013) is a comprehensive resource designed to help educators implement design thinking in their educational settings. The toolkit facilitates practical design challenge solutions through a five-phase design thinking process: Discovery, Interpretation, Ideation, Experimentation, and Evolution. Educators complete tasks through the Designer's Workbook with step-by-step instructions for completing each phase. The IDEO Toolkit applies to various aspects of education, including curriculum design, learning space configuration, development of educational tools and processes, and systemic improvements in education. The IDEO Toolkit is an ideal methodology within the present study because of its student-needs-centered, experimental approach and its inherent qualities as an instrument for documenting outcomes and progress throughout the design process (Heenop et al., 2020). The design challenge for the present study was creating an apparel student needs-centered, accessible gamified module in Adobe Illustrator guided by SDT. The process outline for IDEO starts with Discovery then Interpretation, demonstrated through a literature review, followed by Ideation and Experimentation, in which prototypes are developed and evaluated, and concludes with Evolution, presented as conclusion and discussion (see Figure 1). As suggested by the IDEO toolkit, a whiteboarding approach was utilized through the online application Miro. A link to the board for the study can be found in the Interpretation section.

Figure 1

Method: IDEO toolkit



Discovery

The objective of the Discovery phase is to explore the context of the design challenge. The first step is to identify the researcher's existing knowledge and potential barriers within the challenge. Within the Discovery phase of the present study, the design challenge was focused further into creating an eduLARP for apparel. EduLARP is a relatively new term for role-based gamified scenarios. Gamification was adopted in the Discovery phase as a learning experience students would enjoy and as a framework with high potential to satisfy basic psychological needs and occupational skillset needs simultaneously.

As mentioned, LARP initially arose as a recreational game (Mochocki, 2013; Stark, 2012). The design of a LARP is a massive undertaking that requires extensive planning from the facilitator, known as a game master (Eddy, 2020; Simkins, 2014; Stark, 2012) There are many aspects to adjust and balance when designing any LARP, like how much the game master should need to explain the game to players or for how long the game is intended to run (Nielsen & Andresen, 2016). Bowman (The Mixing Desk of Edu-Larp, 2022) modified these sliders to address educational needs with similar aspects to SDT tenets, such as trade-offs between competition versus cooperation.

EduLARP instructional design for learning. The term eduLARP originates from Østerskov Efterskole, a Danish school that teaches predominantly through roleplay (Hyltoft, 2008). The term represents a combination of educational goals, live-action experiences among participants, and roleplaying as a requisite to complete given tasks (Mochocki, 2013). A participant in an eduLARP roleplays through live action to achieve educational goals. A roleplaying game at its core, eduLARP requires interaction among participants, (or students) as well as ongoing feedback from the facilitator, (or educator). The qualities of an eduLARP which separate it from other game-based learning are 1) personas, or fictional characters, embodied by the students and 2) a vivid narrative setting in which the roleplay takes place (Buckley, 2020; Mochocki, 2013; Simkins, 2014). Although eduLARP is not often used as a term in itself, it is an instructional approach that has been used for decades in education (Balzer & Kurz, 2015; Bowman & Standiford, 2015; Eddy, 2020).

Examples of eduLARP in academic settings. Mock trial, an educational live-action roleplay often employed to educate and develop skills for law students, has existed in its present form at college campuses since at least 1985 (AMTA, 2016). Feinman (1995) investigated a simulation in which legal students practiced linguistic-verbal skills as the personas of lawyers and their clients in mock trials. The outcome of this simulation was more complex; rather than a pass or fail, the court case outcome was determined by a mock jury. Students in this simulation applied their knowledge and synthesized and evaluated it at a critical thinking level. The personas in any mock trial include a judge and an arguing body but may expand to an opposing side and a jury. The setting is the trial itself, often delimited by furniture similar to a courtroom. Farmer et al. (2013) are among many who have expanded the eduLARP into other disciplines; in their study, it expanded to management education. They found students experienced the same positive outcomes: increased critical thinking, creativity, and teamwork.

The setting of the eduLARP may be designed to simulate a workplace in the way a mock trial simulates a workspace for lawyers. Lane & Rollnick (2007) detailed a meta-analysis of medical educator studies employing standardized clinics, a live-action roleplay with simulated patients. They found that the exercise had a significant positive impact on medical professional necessities, like communication skills across many decades and settings. The setting for standardized clinic is a doctor's office or consultation room, and the personas are the patient and the medical professional. This is an example of more contextual and relevant design for an eduLARP rather than a modification or extension of one designed for a different occupation, like mock trial for managers.

Elements of eduLARP for apparel. The learner experience designed by Ma and Lee (2012) to simulate an apparel sourcing career position, had qualities of an eduLARP and was occupationally relevant for the students. The personas – clients and consultants – as well as the setting – apparel sourcing strategy – were representative of what students would one day possibly experience in the real world as apparel professionals. However, the roleplaying aspect of this study was not a focal point and therefore remained unevaluated for its influence on student outcomes. Since roleplay has proven to be a crucial component of positive learning outcomes for students in law and medicine, where occupation-specific skill sets are required (similarly to apparel and those specifically in product development paths/positions), research opportunities exist to assess how skill development for apparel students is affected by the roleplay itself. Additionally, product development skillsets for

apparel students presented through experiential and/or game-based learning like eduLARP have no known investigations at present.

Interpretation

The Interpretation phase in design thinking involves synthesizing themes from the Discovery phase into insights and opportunities. For the present study, key themes emerged around basic psychological needs fulfillment, occupational skill acquisition, and crucial aspects to include in an eduLARP for apparel design. An apparel eduLARP aligns with an ideal learning environment where SDT, AMC framework skills, and accessibility intersect to support student motivation, skill development, and inclusive learning opportunities.

The themes identified through a structured synthesis of insights gathered during the Discovery phase emerged from IDEO's guidance in aiming to understand the needs and motivations of students, the course goals of occupational skill acquisition, and the critical elements necessary for an educational live-action role-play (eduLARP) focused on apparel design. An overview of the process can be found on the Miro board.

Skill development expectations. A simulation is meant to develop specific, predetermined skills, while a game develops skills spontaneously (Klabbers, 2009). Simulations comprise a full model of possible outcomes, while games have more variable outcomes (Hammer et al., 2018). The intended outcomes of a researcher's or educator's study or lesson plan will therefore determine whether their roleplay setting should be a game or a simulation. In the case of eduLARP, the design should be closer to a simulation than a game since intended skills should be predetermined. In an apparel design course, isolating a few key skills is essential as it allows learners to focus on core competencies while also managing cognitive load.

For the present study, this would mean isolating a few key skills the player needs to know and should use to complete the tasks within the game. Within Adobe Illustrator, a vector art software described more thoroughly in the section on apparel student needed skillsets, specific foundational skills include the pen tool for path generation, the type tool for text, the swatches panel for color management, and general layout and organization. These essential industry skills are crucial for creating digital fashion illustrations and technical drawings. While choice is important for autonomy, too numerous or complex options can thwart the fulfillment of competence needs (Katz & Assor, 2007). Focusing the eduLARP to utilize a small set of critical skills provides competency development while providing an optimal level of choice.

Cooperative over competitive. EduLARP should not encourage students to be competitive with fellow students, and the possibility of social comparison should be minimized to provide a safe place to explore and learn (Alfi et al., 2004). This builds relatedness without hindering autonomy in that students are not compelled to compete against their peers. This collaborative approach is also more compatible with experiential learning principles. For the present study, this would require a group activity component at one or more stages of the game, either in preparing for the exercise, executing the skills, and/or reflecting on the experience.

Preparation and debriefing. Roleplay, as well as experiential learning, depend upon preparation, where the participants learn the rules, and debriefing, where participants reflect on the game. In a game designed and evaluated by Grasse et al. (2022), they found that not only did SDT explain the enjoyment or lack thereof for 77 undergraduate students, it explained at which point in participation their needs were satisfied. For example, the students felt autonomy when reading backstories for characters to prepare for the game. They also felt relatedness and competence when reviewing how the game ended based on the choices they made. This demonstrates that preparation and debriefing are fundamental aspects of roleplay and experiential learning, as well as key moments for basic psychological needs to be met and, in turn, motivate learners. For the present study, students had the opportunity to learn more about product development at both the game preparation and the debriefing stage while also fulfilling their psychological needs. This could be through development or review of industry-specific personas in preparation or debriefing in a format similar to an industry exercise, like a project brief.

Ideation

Brainstorming is the primary component within the Ideation phase and allows a designer the opportunity to refine, combine, and adjust ideas which arise. During this phase, the themes from the Interpretation phase and the theory and examples from the Discovery phase led to the conclusion that the game should be the only novel mechanic introduced in the educational setting. As shown in the Miro board, ideas and conclusions were connected through color, arrows, and other organization methods to aid informed game design choices.

An overview of the existing course was explored to ensure there were no aspects of the game which required new knowledge acquisition. The game design document specifies skills students would need to master prior to gameplay in response. For the investigated course, the students complete a tracing activity and a modified tech sketch to demonstrate mastery of the pen tool, selection tool, and direction selection tool. A logo requires mastery of the type tool and functions, and a pattern swatch activity solidifies swatch panel usage, object creation, and advanced fill options. Finally, a technical sketch exercise demonstrates that a student has mastered all of the listed tools along with general navigation, content usage rights, stroke and fill, workflow, layout, and organization. These activities ensure that the student is ready for a project that challenges them to adopt a persona without facing cognitive overload, or the inability to process information due to excess content (Ackerman, 1988; Brom et al., 2019).

Another guiding element in the Ideation phase was SDT. Van Roy and Zaman (2017) outline nine guiding principles to maintain the motivational aspects of games while avoiding the impediment of a learner's psychological needs fulfillment. When considering possible components of the game, each component must be evaluated for autonomy-supportiveness. This is why competition is not part of the game. Despite the opportunity to add a competitive element to a game, it can potentially undermine feelings of relatedness and competence.

Based on the knowledge and guidelines which arose during the Discovery and Interpretation phases of the present study, the Ideation phase generated three concept sets: setting,

scenario, and persona. The setting, based on the occupational skill focus, is Blok-Shoppe, a fictional retail chain that sells apparel and creates in-house designs. The scenario, based on course content, is that players (students) are hired to form technical design teams and complete a design board comprised of technical sketches generated using Adobe Illustrator. The personas, to reduce cognitive load, are cards drawn from a deck. The cards are based on famous designers and include the designers' style interests and career focus. The design brief which details these items can be found in the instructor manual (appendix A).

Experimentation

The Experimentation phase involved rapid prototyping and iterative testing prior to implementation. The initial prototype, a detailed instructional document outlining game mechanics, learning objectives, and player interactions, underwent a rigorous review process involving four key stakeholders: two former students, an industry professional experienced in Adobe Illustrator for apparel, and an apparel product development instructor. Feedback was collected through written edits and one-on-one discussion, allowing for intensive and collaborative discussion.

Based on this feedback, the prototype was developed with iterative improvements addressing issues such as instruction clarity, time allocation, persona descriptions, and scenario relevance. Each round of changes was followed by additional reviewer feedback, ensuring continuous refinement. Once the document-based prototype was sufficiently refined, we conducted small-scale playtest sessions with volunteer students. These sessions provided valuable observations of real-time player interactions, helped identify logistical issues, and gathered immediate feedback on engagement and learning outcomes. Balancing individual and team activities, clarifying connections between game tasks and industry practices, and enhancing opportunities for creative expression within the game structure arose as elements to keep and strengthen in further iterations.

Providing a reasonable amount of choice, allocating ample design time, integrating meaningful social interactions, clearly presenting game goals, and framing the activity as an authentic, industry-inspired experience arose as successful elements to include. These elements accommodated a wide range of players' unique learning needs while avoiding the undermining of basic psychological needs, particularly the potential thwarting of competence needs that could arise from inexperience with roleplay or complex game mechanics. The Experimentation phase ultimately prepared the prototype for classroom implementation, though further iterations are anticipated.

Results and discussion

This design investigation combined Self-Determination Theory (SDT), game design principles, and design thinking methodologies to propose a framework for an educational Live Action Role-Play (eduLARP) in apparel design education. The IDEO toolkit guided the design process through five phases: Discovery, Interpretation, Ideation, Experimentation, and Evolution. Each phase involved specific data collection and analysis methods, ensuring that design research informed every step of the process.

In the Discovery Phase, data from a literature review and course content review generated content ready to be interpreted. In the Interpretation phase, content analysis through visual mapping via Miro identified themes to support brainstorming rooted in apparel industry competencies, apparel student needs, and eduLARP elements. Brainstorming during the Ideation phase generated ideas and aligned them with theory, such as SDT and AMC, found in the Discovery phase. The Experimentation phase included prototyping as well as informal interview data, followed by iterative design development.

The product of this design thinking process is a prototype game design document for "Blok-Shoppe," an eduLARP aimed at addressing the psychological needs of apparel students while promoting competency-specific learning (RQ1). The game is communicated as an instructor manual to facilitate classroom implementation.

"Blok-Shoppe" was designed to provide occupational experiences in an accessible setting, allowing students to apply their skills in practical scenarios (RQ2). By aligning with SDT principles, the eduLARP aims to empower students and foster self-determined motivation. The design thinking approach ensured the module catered to individual needs, engaged students, and emphasized practical competencies (RQ3).

The game pilot, or playtest, demonstrated increased engagement among sophomore-level apparel students. Data collected through journaling and feedback discussions showed that students quickly accepted the concept and demonstrated engagement with a structured learning journey. Thematic analysis of debrief sessions revealed students found the personas helpful for design initiation and appreciated the creative freedom and collaborative aspects. Quantitative analysis of engagement metrics showed improved participation rates compared to traditional lectures. However, qualitative data indicated that some students and the instructor needed more time to adjust to the format fully.

"Blok-Shoppe" presents an accessible and engaging industry-based experience that provides skill development across diverse learning abilities and financial means. The iterative design process, guided by the IDEO toolkit, ensured that the final product was grounded in both theory and practical application, addressing the research questions effectively.

Conclusion and future studies: Evolution

This study demonstrated the effectiveness of utilizing a documented design process to develop an apparel student needs-centered, accessible gamified module. By incorporating SDT and design thinking, the module provided a competency-specific learning experience that fulfilled the psychological and occupational needs of apparel students. The modified IDEO toolkit was a valuable resource in the design process, and the game design document serves as a practical tool for apparel educators to use in their courses. The game developed in this study demonstrates how apparel educators can design a module that offers occupational experiences in a more accessible setting by using design thinking. The instructor manual (appendix A) is a resource for apparel educators to use in their courses, and the findings of this study can inform the design of future accessible and competency-based curriculums for apparel students. The approach to instructional design demonstrated in the present study is useful for apparel educators as it focuses on practical skill

development as well as industry relevance and employability. Apparel students who complete modules designed utilizing this process will be better equipped for apparel and textiles career upon graduation.

Future research pursuits include further analysis of learning impact and skills acquired through the game compared with traditional instructional methods. Additional opportunities for other researchers exist to further develop and evaluate the game module through a large-scale longitudinal study. This would capture a diverse demographic representation of participants as well as representation within and across programs at multiple institutions to investigate the generalizable impact of eduLARP. Finally, this design documentation of pedagogy could be expanded to any course in the apparel curriculum, as could the deployment of an eduLARP. This would involve adapting the eduLARP module to address learning objectives and content of different courses, such as flat pattern drafting, sustainability in apparel, or retail math for the fashion industry. Expanding the deployment of an eduLARP to other courses in the apparel curriculum can offer a versatile and comprehensive instructional approach that promotes accessible skill development, creativity expression, and collaboration across various content areas. The outcomes would include apparel students who are equitably prepared for post-graduation positions in the apparel and textiles industry.

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Appendix A.

Blok-Shoppe Instructor Manual

The educator's guide to running an apparel eduLARP focused on Technical Design

What is Blok-Shoppe?

Blok-Shoppe is a game designed to facilitate mastery of Adobe Illustrator and technical sketch design for university apparel students. The game requires students to adopt personas for the duration of a class assignment completed as a group. Additionally, the assignment presents a fictional scenario in which students, as their persona, are completing a design board for the company they work at: the fictitious Blok-Shoppe. The adoption of personas and the contextualization of the activity in an industry-inspired scenario provides students with a low-stakes opportunity to acquire occupational experience in a highly accessible format.

Why use Blok-Shoppe?

This module was developed to support the fulfillment of students' basic psychological needs while also providing occupational and industry-focused skillsets. Elements of the game were carefully researched and crafted for optimal student outcomes. Additionally, gamification provides a novel experience for students which can break up the pace of a traditional course design. This module is a good option for educators seeking to foster higher motivation, stronger creativity, and mastery of skills in students learning Adobe Illustrator for technical sketching in the apparel industry.

Before running this game in an apparel class, ensure that your students have working proficiency in the following Adobe Illustrator skills:

- Pen Tool
- Select + Direct Select Tool
- Type Tool
- Object creation
- Swatch Panel navigation
- Stroke + Fill
- Advanced Fill options

And the following Adobe Creative Cloud and general design skills:

- Adobe navigation
- Content Usage
- Creativity
- Workflow (on an individual level)
- Layout + Organization

Session 0: LAUNCH

Prior to running the game, introduce the game concept and associated assignment. This may be completed in the previous class period or at the beginning of the first meeting during the game run. The following script may be used to explain the game and the assignment to students:

Blok-Shoppe is an American multinational retail corporation that operates a chain of apparel stores. The concept team has created mood boards to guide the design team. The design team's task is to create technical sketches based on these boards to send to the pattern production team.
You are a technical designer on the design team at Blok-Shoppe. Design and make choices based on your persona card using the mood board and your teammates to support the generation of a technical sketch using Adobe Illustrator. Assemble the sketches for your team into a single design board for presentation to your supervisor.

Session 1: Persona and Group Assignments

Persona
This manual includes persona cards that you may print, to allow for random drawing, or upload into an LMS for random assignment. These persona cards may be modified based on student population, program goals, or educator goals of empathy building.
Groups
Assign groups based on a Mood Board array, allowing students to choose. Depending on your class size, groups of 2-4 work best for this activity.
Assignment Description and Design Work
Share the Player Handbook/Design Brief with your students. This may be uploaded to your LMS or distributed manually.

Blok-Shoppe Player Handbook: Design Brief

Game Description
You are a technical designer on the design team at Blok-Shoppe. Blok-Shoppe is an American multinational retail corporation that operates a chain of apparel stores. The concept team has created mood boards to guide the design team. The design team's task is to create technical sketches based on these boards to send to the pattern production team.
How to Play your Persona
You have been given a persona card. Refer to this card to complete this activity as your persona.
When talking to teammates, thinking through designs, and deciding how you might be seen and how you might see yourself in a workplace, imagine that you are the persona listed on your card. Try your best to consider your teammates as their respective personas as well.
Assignment Description
Your team will submit a design board with your technical sketches. The Blok-Shoppe production team requires design boards with a color palette of 5 colors and at least 1 pattern swatch. Each sketch must include a) a front view and b) one additional view of either the side, back, or a detail.
Design and make choices based on your persona card using the mood board and your teammates to support the generation of a technical sketch using Adobe Illustrator. Assemble all the sketches from your team into a single design board. All sketches and the final design board must be generated using Adobe Illustrator.

Tips and Tricks
- Do not feel pressured to act or perform in an unusual or uncomfortable way. Generally, your normal speaking voice will work well for playing your role.
- Utilize resources provided throughout the class, such as how-to videos or instructor guidance, but try to view your use of these items from the perspective of your persona. For example, how might your persona ask for help?
  - You, as yourself, might say "I don't know what this tool does" whereas your persona might say something like "This is not something I've ever needed to know before, tell me what this tool does" – different subtle changes like this will help you feel more immersed in your persona.
- Try to use your persona name and your teammates' persona names frequently, even if it feels a little clunky.

Session 2: Design Work

Plan for students to have roughly 200 minutes of design work for this project. This may vary based on class scheduling, class size, and general class skill levels. Be sure to provide refreshers of game procedures at the beginning of new class meetings if there are multiple meetings for design work.
Provide guidance and assistance on technical design, Adobe Illustrator, and assignment clarity as needed. These interactions are opportunities to reinforce persona adoptions. Some examples of supporting persona adoption might be referring to the student by their persona names, asking them questions with the prompt of answering as their persona, and gently reminding teams to refer to each other by their persona names.
Design work will be the least active time for the educator facilitating this game, but the most active time for the student players.

Session 3: CLOSING

Assignment Submission and Grading
Students will submit their completed design boards. There should be one (1) design board for each team, i.e., one design board per mood board. Each design board will include all front sketches and additional view sketches. Grading for this assignment may be individual level, group level, or a combination of the two.
Debrief
Allow students to drop their personas and facilitate an informal group discussion about their feelings experienced during the game. Some helpful prompts include:
- Do you feel more confident in Illustrator?
- How did adopting a persona change the way you approached designing?
- If you were asked in a job interview about real-world experiences, would you discuss this game?

Instructor Reflection
Be sure to give yourself the opportunity to reflect during and following the debrief.
What elements were successful and why?
What elements were unsuccessful and why?
Do you feel that student learning outcomes were achieved?
What else might you change next time?