THE APPLICATION OF DEEP LEARNING DRIVEN COMPUTATIONAL CREATIVITY IN KNITTED TEXTILE DESIGN

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The application of Deep Learning driven Computational Creativity in Knitted Textile Design

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ABSTRACT

In recent years, artificial intelligence (AI) has proliferated into an expanding array of interdisciplinary applications across various industries and academic fields. In particular, it has been increasingly applied as a tool to facilitate or exhibit creativity. When it comes to the fashion & textiles industry, while there has been an evident movement towards digital tools and automation, and a recognition that AI applications can benefit productivity, however it is ultimately found that the practical, scaled adoption of AI is skewed towards the business, manufacturing and retail functions of the industry, and away from the creative design functions, where AI applications remain largely experimental and hypothetical. Furthermore, existing studies of AI applied to creative design functions of the fashion & textiles industry are largely focused on outward design elements such as style, silhouette, color and pattern, and lack in addressing inward textile material elements such as structure, composition, and finish. Furthermore, the outcomes of existing studies manifest a lack of practical applicability to the real-world situation of the creative design process in the fashion & textiles industry.

Therefore, to address this gap, this study aims to explore the practical and creative potential of AI, in the form of deep learning driven computational creativity, to facilitate the textile design component of the real-world creative fashion design process. To achieve this, the study addresses three research objectives (RO) as follows: (1) to systematically explore the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process (which is encompassed in the literature review section), (2) to devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process (which is exhibited by the methodology and results section), (3) to evaluate empirically the creative value and practical utility of the devised computational method (which is exhibited by the conclusion section). Consequently, the scope of this study encompasses the intersection of 3 key topic areas: deep learning, knitted textiles, and the creative design process. Each of these 3 key topic areas are interpreted as respective subfields of: Computing (AI), Fashion (Textiles), and Creativity (Creative Practices). The intersection of these 3 themes represents the gap manifested in existing literature which this study aims to tackle.

In terms of methodology, RO(1) was conducted by a systematic thematic literature review, with both academic and industry sources, RO(2) adopted a practice-led approach to devise the applied computational method intended to facilitate knitted textile design in the context of the creative fashion design process, by involving digital programming and design tools and physical knitting machinery

tools, and RO(3) used a mixed method of surveys & interviews to evaluate the devised computational method applied, with general public and fashion industry experts respectively.

The outcome produced by RO(1) was a contextual perspective of the intersection between this study's 3 key themes (deep learning, knitted textiles, and the creative design process), which subsequently indicated a research gap in textile-focused creative fashion design applications of AI that have real-world, practical utility, and that are devised to facilitate the design process, not just execute product creation. The result of RO(2) was an AI driven computational method (based on a deep learning StyleGAN model), able to generate recognizable knitted textile images with distinguishable physical attributes (such as stitch, gauge and hand-feel), that proved to be sufficient visual reference for factory knitting technicians to interpret into corresponding physical swatch samples. The results from the evaluative surveys and interviews of RO(3) suggest that the devised AI driven computational method could contribute creative and practical value if adopted as an assistive tool to facilitate knitted textile design in the creative fashion design process. Furthermore, the survey results indicate that the AI generated knitted textile images were viewed by participants with the same level of discernment towards the physical and aesthetic attributes as the real ones. Then when projected onto garments, the generated knitted designs were rated overall more creative, fashionable, and buyable than the real ones. The findings from the interviews with fashion industry experts indicate a collective openness to AI facilitating the creative fashion design process, but only as an assistive tool to shoulder the non-creative tasks of the design process, such as deciphering data on customer needs and market trends or for providing design inspiration that empowers designers to do their creative tasks more effectively. The interview results also indicate an overriding consensus that the absence of tactility is a major barrier to embracing any form of digital based tools for knitted textile design, according to the design creatives.

The outcomes of this study have both theoretical and practical significance. The theoretical significance manifests in the novelty of applying a GAN based deep learning model towards the textile component (specifically, towards the uniquely spatial attributes of knitted textiles) of the fashion design process, and in the novelty of the empirical methodological approach which took into consideration the realities and challenges of the creative fashion design process. In terms of practical significance, this study has shown that if the devised AI driven computational method was applied in a real-world fashion industry context, it has potential to: (a) augment creativity of designers by providing data-driven textile design inspiration and alleviating non-creative tasks, (b) increase operational efficiency by reducing workload, (c) be digitally compatible for an increasingly digital fashion design process, (d) foster sustainability by reducing waste and sampling needs, (e) reduce development lead-times and costs, (f) inform customer needs and trends by learning from the dataset.

All in all, this study's application of deep learning driven computational creativity in knitted textile design has the potential to positively impact and evolve the fashion & textiles industry's creative designers, process, and product.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 Background of Study

"Technology will inform the warp and weft of the fabric of fashion's future."

– Todd Harple (Harple, 2016)

In recent years, artificial intelligence (AI) in the form of deep learning has been increasingly applied as an interdisciplinary tool to achieve computational creativity in various creative practices, demonstrating an innovative potential to facilitate creative processes and expand or exhibit creativity in an autonomous manner (Franceschelli & Musolesi, 2021; Gaggioli, 2017; Goodfellow, 2016; López de Mántaras, 2017; Mazzone & Elgammal, 2019; Spratt, 2018a; Zhao et al., 2019).

The fashion industry's creative design process – a creative practice which has historically relied heavily on physical materials and samples – has nonetheless been undergoing a "industry 4.0" digital revolution (Abnett, 2016a; Bertola & Teunissen, 2018) where it has seen a growing adoption of computational design support tools (a term used throughout this study to encompass what is also often referred to as digital, virtual or intelligent design tools or applications), such as: computer-aided-design (CAD), product lifecycle management (PLM), 3D virtual sampling software, and 3D or digital printing systems (Cheng & Cheng, 2012; Eckert et al., 2000; Satam et al., 2011; Segonds et al., 2015). This digital revolution – fueled in recent years by the global urgency towards sustainability, COVID-19 pandemic supply chain disruptions, and the hype of the metaverse and digital asset technologies (e.g. NFT's and blockchain) – has received mounting coverage in academic studies and industry reports. So much so that the Business of Fashion (BoF) and McKinsey & Company dedicated a special edition of their quintessential annual "State of Fashion" report to the topic of "existing and emerging technologies" in the fashion industry (which encompasses in large part the computational design support tools mentioned above), and furthermore projects fashion companies to invest 3-3.5% of their revenue towards such technologies by 2030 (Business of Fashion (BoF) & Mckinsey & Company, 2022).

Indeed, this trend aligns with what many studies have indicated about the benefits of the "industry 4.0" digital transformation: that computational tools can facilitate the fashion creative design process in terms of increasing operational efficiency, reducing timing & costs, promoting sustainability, gauging market needs, and ultimately augmenting design creativity (Arthur, 2018; Bertola & Teunissen, 2018; Business of Fashion (BoF) & Mckinsey & Company, 2018; Dudukalov et al., 2021; McDowell, 2018; Mosca & La Rosa, 2019). The Business of Fashion (BoF) and Mckinsey & Company (2022) quantified the operational efficiency and customer engagement benefits of integrating digital tools into fashion value chain processes could amount to an up to 50% increase in speed to market, 8% rise in full-price sell through, 20% decline in manufacturing costs.

These lauded benefits of digital 4.0 technologies and the extensive creative applications demonstrated by deep learning, should in theory incentivize the fashion industry's creative design functions to embrace the burgeoning technology of deep learning AI driven design support. However in reality, when it comes to the fashion industry's creative design process, it is found that the practical adoption of deep learning AI applications has been limited, and generally skewed towards "non-creative design" purposes such as enhancing customer experience & engagement (e.g. with purchase recommendations, virtual assistants, virtual try-on), demand forecasting or and supply chain logistics (Bughin, 2017; Business of Fashion (BoF) & Mckinsey & Company, 2017, pp. 60-61; 2022; Luce, 2019, pp. 125-139).

One typical reason for the resistance towards scaled practical applications of deep learning AI in the fashion creative design process is the impression that it will mechanize the creative process, devaluing creativity and the role of designers (Arthur, 2018; McDowell, 2018). Indeed this line of thought echoes an age old skepticism and trepidation toward whether computers can be considered a creative medium or generate output that can be deemed creative and replace the need for human creatives – concerns repeatedly expressed throughout history whenever a new technology is introduced to society (e.g. when photography emerged as an art form), and then repeatedly mitigated after the said technology proves that it can expand creative possibilities, as a tool rather than a replacement, for humans (Mumford, 2000). In the case of the fashion creative design process, such concerns are misled and overlooks the reality that digital technologies are already very much embedded in the day-to-day practice and can prove effective as a tool which empowers designers in their creative process rather than replace them (Arthur, 2018; McDowell, 2018).

Another barrier to the momentum towards deep learning AI applications in fashion's creative design process is that it has historically been slow to change due to the convoluted and nuanced nature of its processes, that also vary diversely between product categories and market segments. This means that it is very difficult to find an one-size-fits-all digital tool that addresses the full scope, beginning-to-end, of the fashion value chain (Business of Fashion (BoF) & Mckinsey & Company, 2022), therefore companies are required to customize their own digital strategy of appropriate tools to adopt, which practically speaking, requires a great deal of investment, strategy and skills retraining in order to implement (which for many companies that are still functioning on traditional practices is not worth the disruption or at least not a priority).

Furthermore, a review of existing studies of deep learning AI applications for fashion's creative design process suggests two less obvious limitations which could hypothetically be factors deterring its real-world adoption. One limitation, manifest by studies that come from a computer science background, is that, although highly technical and theoretical, they lack in practical application, as they tend to focus on *product* over *process* and be out of touch with the nuanced realities of the fashion industry's creative design process and how designers use computational tools most effectively within it. In particular, this is exemplified in the lack of deep learning AI studies that pay attention to the underlying textile design component of the fashion creative design process, and instead predominantly focus on outward aspects such as style or silhouette design. This indicates an oversimplified interpretation of the fashion creative design process which does not sufficiently acknowledge how integral the textile is to a fashion design – particularly when it comes to the product category of fully-fashioned knitted goods whereby both textile and product are inextricably correlated in their design & development (Kaldor et al., 2008; Udale, 2014). The second limitation of existing studies on deep learning AI for the fashion creative design process is manifest by empirical studies from a fashion business & management or practiced-based design perspective. The majority of such studies, although more in tune with the realities of the fashion creative design process, are focused on computational technologies in the form of [virtual sampling, PLM, CAD, or 3D printing] design support tools as opposed to the nascent technology of deep learning AI driven computational creativity.

The aforementioned barriers and limitations point to a gap in the understanding of if and how deep learning driven computational creativity can facilitate creativity and practical needs in the fashion creative design process. Thus, addressing this research gap, the overarching aim of this study is to investigate whether a deep learning based computational creativity can facilitate the textile design component of the fashion creative design process as a collaborative support tool, in practical and creativity-augmenting ways. More specifically, in order to achieve this, this study endeavors to:

1) Explore research area and methods by conducting a systematic literature review which explores the intersection between:
    a. Textiles (Knitted Textiles), within the larger context of Fashion
    b. Artificial Intelligence (Deep Learning), within the larger context of Computing

    c. Creative Practices (Creative Design Process), within the larger context of Creativity
2) Devise, with a practice-led approach, a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.
3) Evaluate empirically, with a mixed method (of surveys & interviews with fashion industry professionals), the creative value and practical utility of the devised computational method.

The key intent of this approach is to be able to achieve an outcome which bears practical relevance to the fashion industry's creative design process, and not just technical and theoretical significance of product creation.

1.2 Research Aim & Objectives

This study seeks to contribute to understanding the real-world application potential of deep learning driven computational creativity for the textile design component of the creative fashion design process. The consequent research aim and objectives are stated as follows:

Research Aim:

To investigate the potential of a deep learning based computational creativity to facilitate the textile design component of the fashion creative design process in terms of practical utility and creative value.

Research Objectives:

1) Explore systematically the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process.
2) Devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.
3) Evaluate empirically the creative value and practical utility of the devised computational method.

1.3 Methodology

For each of the stated research objectives, the respective methods, as shown in Table 1, will be employed:

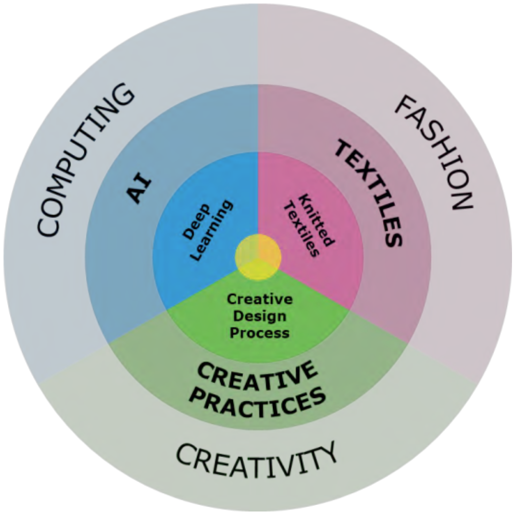
Table 1: Research Objectives & respective Methodology/Methods summary

Research Objective	Methodology	Method (procedure/tools/sources)
1) Explore systematically the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process.	Thematic Literature Review	**Academic sources**: e.g. journal publications, conferences **Industry sources**: e.g. news articles, reports, exhibitions
2) Devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.	Practice-Led	**Digital tools**: Python, Clo3D, Runway ML, Excel, Stoll M1Plus **Physical tools**: Stoll knitting machine, hand knitting loom
3) Evaluate empirically the creative value and practical utility of the devised computational method.	Mixed Method	**Survey**: General Public via online forms platform survey **Interviews**: Fashion industry experts (with real – world experience) through questions / conversation via video conferencing platform

1.4 Scope of Study & Definitions

This section will attempt to clarify the scope of this study and define some of the key terms. The scope of this study encompasses the intersection of 3 key topic areas: deep learning, knitted textiles, and the creative design process. Each of these 3 key topic areas are interpreted as respective subfields of: Computing (AI), Fashion (Textiles), and Creativity (Creative Practices). See Figure 1 for a visual portrayal of this scope.

Figure 1: Scope of Study topic areas portrayed visually



In other words, the study's specific aim is to tackle Figure 1's inner-most convergent topics, but in the broader context of the respective fields indicated in the surrounding concentric layers. This attempt to engage with the key topics "in context" is to foster an interdisciplinary perspective and application in the outcomes of this study. The scope and definition of the terms which appear in Figure 1 are further clarified below, where potentially questionable terms or gray areas referenced in the study's objectives are elucidated:

Research Objective	*Methodology*	*Method (procedure/tools/sources)*
1) Explore systematically the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process.	*Thematic Literature Review*	***Academic sources**: e.g. journal publications, conferences* ***Industry sources**: e.g. news articles, reports, exhibitions*

- "deep learning driven computational creativity" indicates a focus on computational methods that manifest or facilitate creative augmentation.
- "creative design process" will be interpreted and explored first from a broad perspective, as "creativity" (e.g. humour, intelligence in general) and subsequently narrow in on "creative practice" (e.g. art, music, dance, design…), and then "creative design process" (a function within a creative practice).

- the literature review section of this study will also refer to the encompassing fields for the purpose of gaining a wholistic, fundamental basis of understanding to inform the research direction and method.

Research Objective	*Methodology*	*Method (procedure/tools/sources)*
2) Devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.	*Practice-led Method*	***Digital tools**: Python, Clo3D, Runway ML, Excel, Stoll M1Plus* ***Physical tools**: Stoll knitting machine, hand knitting loom*

- "deep learning based computational method" indicates the objective's focus should not be the deep learning model, but the overall method or process which augments fashion creative design process.
- "facilitates" indicates that the computational method does not need to take over the design task, and can range in its level of control or autonomy to being facilitative.
- "creative" part of the design process refers to the aesthetic exploration, ideation, and generation stages in fashion design (as the totality of the fashion "creative design process" involves technical / manufacture / engineering aspects, which are not the focus of this study). It is what LaBat and Sokolowski (1999) refer to as the "creative exploration" stage, common to clothing design processes as well as other creative design processes.

Research Objective	*Methodology*	*Method (procedure/tools/sources)*
3) Evaluate empirically the creative value and practical utility of the devised computational method.	*Mixed Method*	***Survey**: General Public via online forms platform survey* ***Interviews**: Fashion industry experts (with real – world experience) through questions / conversation via video conferencing platform*

- "Evaluate empirically the creative value and practical utility" indicates experimentally "testing" the computational method outcome for its creative and practical value to the relevant target audience and target task. It also aligns with Boden (2004) definition of creative product (i.e., the result of an act of creativity) to be that which is both novel and valuable (i.e. useful).

- "Fashion industry professionals" refers to people who have experience working in the fashion industry (inclusive of the textile industry).

1.5 Research Significance & Value

One key significance of this study lies in discovering the potential of artificial intelligence to enhance and advance textile design creativity, an integral part of the creative fashion design process, with the practical competencies – of automation, optimization, customization, or prediction – that artificial intelligence has already deeply embedded into the micro of our everyday lives to the macro of industry systems. According to a 2017 Mckinsey & Company report, the industries with the most extensive adoption of artificial intelligence technologies (high tech and telecommunications, automotive and assembly, and financial services) have applied it most heavily towards the enhancing customer experience (customer service and sales & marketing) and operations (Bughin, 2017). Subsequently, the report ascertains that the most practical and pervasive competencies of artificial intelligence, particularly for customer-facing or product-driven industries, have centered on leveraging data and computational power to achieve automation, optimization, customization, or prediction. In other words, artificial intelligence has become an indispensable tool for harnessing the exponentially growing supply of data, fueled by the rapid expansion of online platforms, to inform computational systems towards automating operations, optimizing performance, customizing results (to individual customer preferences), and predicting trends. A similar pattern of progress is reflected in the fashion industry, which even though has been comparatively slower in adopting artificial intelligence due to its tendency to rely on creative instinct, has nonetheless seen artificial intelligence have the a tangible presence in functions such as "demand forecasting" (e.g. projecting order quantities or trends), "operations automation" (e.g. automating manufacturing processes or fabric defect detection), and "customer experience enhancement" (e.g. online shopping recommendations or customer style & size customization via subscription services) (Amed, Nov 2017; Luce, 2019).

The practical value derived from these artificial intelligence advancements ultimately comes down to more autonomous, pre-emptive, accurate decisions that are supported by data and computational power, which result in minimizing the loss of time, money, and environmental resources. For example, in the case of online shopping recommendations, a machine learning algorithm trained on the target customer's data based on their past preferences, can enable it to, accurately and pre-emptively, predict and meet their future needs – thus improves sell-through and reduces leftover inventory for markdown. Or for example an AI fashion style assistant, powered by a deep leaning based computer vision model, could process billions of online photos to identify products that not only fulfils a customer's search query but additionally, based on having learned their past preferences, aligns with their personal style and does not conflict with what they already own – a capability already exemplified by Facebook's GrokNet (Berg et al., May 19, 2020; Lee, May 26, 2020) – and ultimately has the potential to streamline the shopping experience and increase conversion rates. These advantages of artificial intelligence not only benefit the customer, in finding product that is more fitting in a more efficient manner (consequently saving money and time), but also trickle up to the business, by informing aspects such as design and production order quantities to better reflect actual customer demand, which will consequently reduce loss from over-development and over-sampling in the product development process or from leftover inventory at the end of the product life-cycle. In fact, it has been formally acknowledged that the adoption of artificial intelligence can produce quantifiable benefits for businesses: according to a report by the Business of Fashion and Mckinsey & Company, "an AI-based approach for demand projection could reduce forecasting errors by up to 50 percent, while overall inventory reductions of 20 to 50 percent are feasible" (Amed, Nov 2017). The strategy of harnessing data to inform business decisions, a key attribute of artificial intelligence, has also proven to be a defining competitive advantage which can empower companies to make better decisions and bring about measurable results in terms of sales and return on investment (Fox, 2018). Thus, artificial intelligence can concretely enhance financial profitability as well as environmental sustainability that benefit both customers as well as businesses.

Considering the practical and concrete ways artificial intelligence has contributed to various industries including fashion, it prompts the question of whether it can do the same for the less ventured, but very defining function in fashion, creative fashion design, particularity for a category as nuanced as knitwear. Of course, artificial intelligence has already been widely experimented with in conjunction with the superficial two-dimensional visual elements of creative fashion design, but the question remains on whether it can be applied at a more elemental level, down to the underlying technical elements of the textile, yarn or even fiber. This possibility would be highly significant as, by applying artificial intelligence to the creative fashion design process at an elemental level would mean enabling data-driven computational algorithms to inform and hone the underlying technical elements of the textile, yarn or fiber in a way which could potentially result in a more effective fashion design outcome e.g. one that is automatically generated, optimizes different variables, customized to a specific target customer, and embodies predicted trends. By 'automating, optimizing, customizing and predicting' fashion designs in such a way could ultimately lead to supplying product that more accurately and efficiently meets real-time demand, thereby improving profits and minimizing loss of resources.

Aside from having the above practical value, the study also yields theoretical value in its potential to contribute insight into the prevalent, ongoing theoretical enquiry of whether artificial intelligence, embodied in machines or computers, can exhibit, facilitate, or enhance creativity, and specifically in the nuanced context of designing knitted textiles for fully-fashioned knitwear, which uniquely involves technical traits as well as aesthetic visual traits. This theoretical enquiry can be broken down into 2 parts: (1) whether artificial intelligence can exhibit, facilitate, or enhance creativity in knitted textiles design, (2) whether there is a real, practical utility for artificial intelligence in the creative fashion design process. Many existing studies, particularly in the field of Computational Creativity, which have tackled this theoretical enquiry, have demonstrated the potential of artificial intelligence to contribute creatively in fields such as fine art, music and writing (M. Boden, 2009; López de Mántaras, 2017; McCormack & D'Inverno, 2012). Indeed, across the studies, the degree of autonomy and the extent of creativity that is credited to artificial intelligence (vs. the human programmer) remains contested, however there is an overarching consensus throughout these studies that the end goal is not for artificial intelligence to achieve full autonomy and replace humans in creative tasks (a lofty and impractical expectation), but instead to collaborate with them as a tool to facilitate and enhance their creativity in those tasks. As summarized by Pedro Domingos, the practical expectation "is not that AI will completely replace designers, but will become an indispensable tool for them" which will "amplify their creativity rather than replace it" (Abnett, Apr 7, 2016). Thus, considering the significance of the ongoing, prevalent theoretical enquiry regarding the creative potential of artificial intelligence, and of the practical utility it has demonstrated in various creative domains as a collaborative tool, it justifies our study of applying it towards the creative design of knitted textiles for fully-fashioned knitwear.

CHAPTER 2: LITERATURE REVIEW

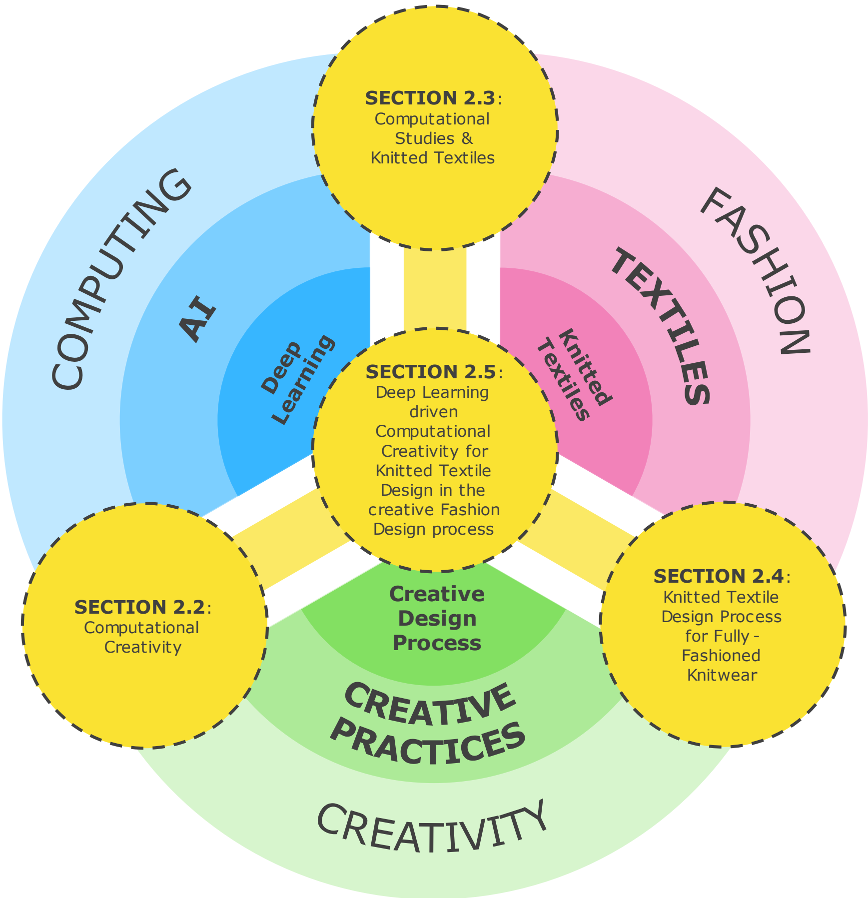
2.1 Introduction & Organization of Literature Review

Before proceeding to tacking this study's objective of devising a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process in potentially practical and creativity-augmenting ways, it will begin by first conducting a literature review which will inform the direction and methodology of that objective.

The literature review will approach the 3 thematic segments of the study's objectives, (differentiated by 3 different colors represented in Figure 1 in Section 1.4 of the Introduction) with a systematic organizational methodology, addressing the themes from "outward-in" and also "side-by-side". By "outward-in", this means the literature review will start with the broader themes in the outer tiers of Figure 1 (of Computing > AI, Fashion > Textiles, and Creativity > Creative Practices), and gradually hone in towards the key objective topics in the inner circle (of Deep Learning, Knitted Textiles and the Creative Design Process, respectively). This "outward-in" approach is so as to culminate in a holistic contextual understanding of the objective's key themes, and ultimately foster interdisciplinary perspective and application in the outcomes of this study. By "side-by-side", this means the literature review will approach the intersection between adjacent pairs of the 3 thematic segments.

See Figure 2 for a visual representation of the described organizational methodology for this literature review, which captures the 3 thematic tiered segments, their respective intersections to be explored, and the Sections of the literature review they correspond to. The converging of 3 themes in the center represents the study's focal topic.

Figure 2: Organizational methodology of Literature Review portrayed visually



2.2 Computational Creativity

This Section 2.2 of the literature review is dedicated to the intersection between the adjacent thematic segments in Figure 2 of Creativity / Creative Practices / Creative Design Process and Computing / AI / Deep Learning, collectively manifest as the topic of Computational Creativity.

2.2.1 Introduction

Computational Creativity is defined by Wiggins (2006) as ‘‘the study and support, through computational means and methods, of behavior exhibited by natural and artificial systems, which would be deemed creative if exhibited by humans’’. Thus, it involves the application of computational methods towards producing creative work, as well as the theoretical understanding of human creativity and the creative process through computational concepts (Colton et al., 2009). Although computational creativity is regarded as a subfield of artificial intelligence (López de Mántaras, 2017), its emergence predates the modern manifestations of artificial intelligence that have been empowered by the Big Data and Internet of Things era. Historically, computational creativity has been achieved via computational methods such as traditional programming, evolutionary algorithms, and only more recently has it involved methods of artificial intelligence such as machine learning and deep learning.

In particular, this section will review the theoretical foundations and practical applications of computational creativity in various creative practices (e.g. art, music, literature, creative design), highlighting the evolution of computational methods applied (e.g. processing, evolutionary algorithms, machine learning, deep learning). Essentially, it will approach the themes of computational creativity from general (i.e. creativity x computing) to more specific (i.e. creative design process x deep learning), as expressed by the concentric tiers expressed in Figure 2.

The purpose of this section is to culminate in an understanding computational creativity and its methods and means of facilitate creative practices such as the creative design process, which will ultimately inform the study's Objective 2 in devising a suitable computational method.

2.2.2 Distinguishing Computational Creativity vs. Design Computing

It is worth clarifying the distinction between the somewhat overlapping terms of Computational Creativity and Design Computing. Both are similar in end use "the goal in the end is to use, propose, and/or produce computational systems, computational algorithms, computational models, and/or computational representations related to design and/or creativity." But the approach is different. Computational Creativity is defined in Section 2.2.1, and Design computing is defined as "the practice of design activities through the application and development of novel concepts and techniques in computing" (Gómez de Silva Garza, 2019).

2.2.3 Practical Applications of Computational Creativity via Programming and Evolutionary Algorithms

There has been a longstanding pursuit towards the crossover of computational capabilities and creative practices, with some of the earliest applications emerging in the 1950-60's (Fernandez & Vico, 2014; Victoria and Albert Museum, 2016). In visual arts, computational creativity was manifest in the defining works of Georg Nees, Frieder Nake (Boden & Edmonds, 2009), Lillian Schwartz (Vogel,

2016) and Harry Cohen (Cohen, 1995; McCorduck, 1991) which consequently helped establish the fields now known (often interchangeably) as “computer art”, “generative art” or “algorithmic art”. The musical equivalent has been exemplified in David Cope’s and Hannah Davis’s use of machine learning to compose music (Cope, 2004; Davis & Mohammad, 2014; Eyeo Festival, 2019a) and Daniel Temkin’s use of sound algorithms to manipulate images (Temkin, 2018), which likewise paved the way for musical categories of “computer music”, “algorithmic composition” or “generative music”.

Indeed, computational creativity has continuously evolved and expanded over the years, often shaped by new computational developments that emerged along the way. For example, another generation of formative works in computational creativity was characterized by the use of genetic algorithms, a mode of evolutionary computing (Elgammal et al., 2017) emulating biological evolution to perform an iterative process towards optimization of an output based on a regulatory “fitness function” (Warwick, 2012), famously adopted in Simon Colton’s generative art program, Painting Fool (Colton, 2012), Karl Sims’s generation of autonomous virtual creatures (Sims, 1994), and towards formulating musical compositions (Horner & Goldberg, 1991; Matić, 2010). Then in the early 2000’s, the emergence of new programming capabilities enabled by Flash, and later Processing, once again spurred new creative possibilities, introducing “new vehicles for creating art” (Bailey, 2020).

In terms of theoretical contributions of computational creativity, it has helped to demystify creativity (M. Boden, 2009; M. A. Boden, 2009; Colton, 2008; López de Mántaras Badia, 2013). As human creativity has been viewed as an elusive, qualitative phenomenon, the process of engineering computers to perform creatively has warranted a need to define and model creativity in quantifiable terms, often in relation to the seminal notions of creative behavior such as those of Boden (2004), Colton (2008), Wiggins (2006), and Gero (1996). Studies have approached this from two main angles: some have let theories of creativity inform their applications of computational creativity for generating or evaluating creative work (DiPaola & Gabora, 2009; Elgammal et al., 2017; Elgammal & Saleh, 2015; Noord et al., 2015; Norton et al., 2013), while others have also taken the reverse approach by analyzing an application of computational creativity – and “exploring the perception of creativity in an artificial system” (Norton et al., 2013) – to allow it to further inform our understanding of creativity (DiPaola et al., 2018; Elgammal & Saleh, 2015). Another contribution of computational creativity is its potential to add creative and aesthetic value to the creative product and process. Even though there are varied opinions on the extent to which the computationally exhibited creative behavior can be credited to the computer over their human counterparts (McCormack, 2005), there is an overarching consensus that ultimately the computational models have the potential to facilitate and even expand human creativity towards new possibilities as a “creative collaborator” (Abnett, 2016b; Colton, 2012;

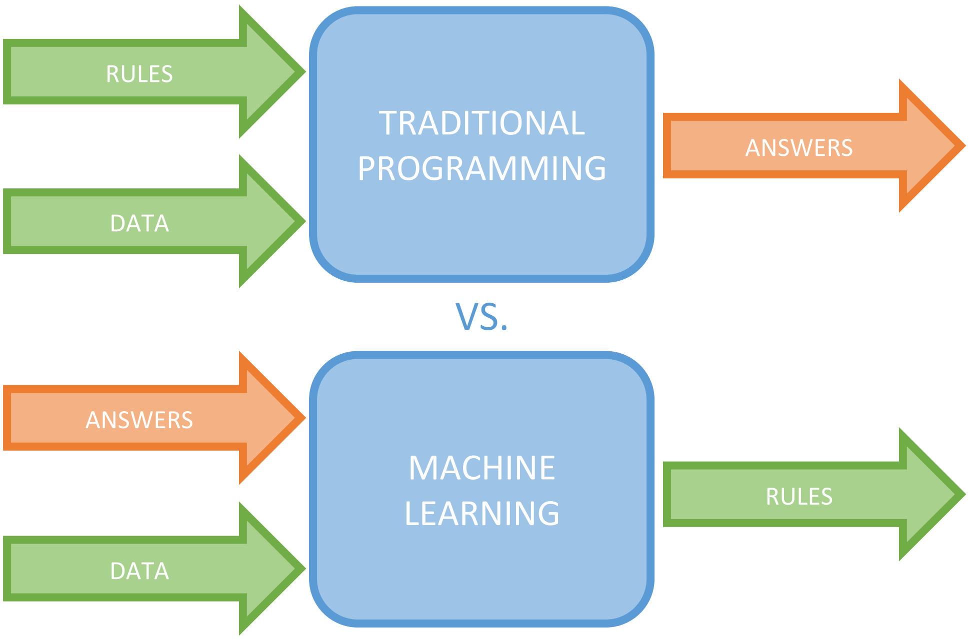
Colton et al., 2009; Elgammal, 2019; Jones et al., 2012; López de Mántaras Badia, 2013; McCormack & D'Inverno, 2012, pp. v-vi; Spratt, 2018a).

These pioneering explorations of Computational Creativity helped pave the way for considering the creative potential of computers and validate computers as a worthy creative medium. But as observed by Simon Colton in regards to the Painting Fool he developed, one of the apparent limitations of the aforementioned computationally creativity examples was that they were "more lacking in appreciative and imaginative behaviors than in skillful behaviors" and their inability to "assess its own artworks and those of others against various aesthetic considerations is a major gap in its abilities" (Colton, 2012). In other words, they were able to execute the task as programmed, but unable to self-learn, self-evaluate, self-improve, and therefore, lacked true creative autonomy. So, while ground-breaking at the time, these pioneering feats of computationally generated art behaved more as what we now retrospectively view as "computer-aided design" i.e. using computers as a means to create art, as opposed to enabling a computer to act as the artist itself. This gap has since narrowed with the more recent developments in machine learning and particularly deep learning, which have arguably come closer to enabling computers the [self-learn-, self-evaluat-, self-improve-]ing ability expected of an autonomous creative agent. Thus, having reviewed the precursory foundations of computational creativity, the next section will proceed to explore the most recent studies in the field in light of contributions from machine learning and deep learning.

2.2.4 Practical Applications of Computational Creativity via Machine Learning and Deep Learning

While the aforementioned pioneering examples of computational creativity leveraged the programming capabilities which were novel at the time, the more recent generation of developments in computational creativity have been greatly shaped by the rise of machine learning and deep learning. Machine learning is defined as "a field of study that gives computers the ability to learn without being explicitly programmed" (Nicholson, 2019a), thus its main distinction from the earlier traditional programming capabilities is the ability to self-sufficiently adjust (i.e. learn) upon additional training data, without relying on a human to explicitly program the steps to do so. A visual portrayal of this distinction between traditional programming and machine learning is conveyed in Figure 3

Figure 3: Diagram expressing the difference between traditional programming and machine learning



Source: Adapted from deeplearning.ai

From a data science perspective, machine learning can also be related to statistical models (such as regression, classification and clustering) which enable a computer to essentially perform the following steps self-sufficiently: analyze a large amount of data, deduce a trend based on the data, extrapolate a future or hypothetical prediction based on the trend, evaluate the accuracy of that prediction compared to the original data, fine-tune the trend accordingly, then the cycle repeats as needed, enabling a continual autonomous feedback loop which improves in performance over time (Eremenko, 2016).

Deep learning, on the other hand, has been regarded as a more powerful branch of machine learning that specifically employs architectures known as neural networks, which process the features of input data through multiple 'hidden layers. These 'hidden layers' essentially enable the multiple features of the input data to be analyzed, and multiple connections between features to be deduced (LeCun et al., 2015). This multi-layered architecture of neural networks makes deep learning effective for processing large amounts of input data that is unstructured, unlabeled and non-linear (Alqahtani et al., 2019; Luce, 2019) to derive "context and associations" (DiPaola et al., 2018) and produce "unpredictable" and "counter-intuitive" results (Gero, 1996; Goodfellow et al., 2014; Szegedy et al., 2013) which reflect creative characteristics as defined by seminal studies, such as skill, imagination, appreciation (Colton, 2008), novelty, surprise and value (M. Boden, 2009) – and thus is ultimately what makes deep learning conducive to manifesting creativity.

The deep learning models which have garnered the most attention for performing creatively include: Artificial Neural Networks, Convolutional Neural Networks and Generative Adversarial Networks. Below provides an overview of each model in terms of its architecture, functionality, and some exemplary creative applications:

- Artificial Neural Networks (ANN) are mirrored on the structure and functioning of biological neural networks in the brain. They rely on feeding inputs, each multiplied by a given weight, into "neurons" which sum up the weighted inputs and compares that sum to a threshold. If the sum meets or exceeds the threshold, then those "neurons" trigger an affirmative output. In an ANN there are multiple layers of these neurons – forming a computational network which processes multiple inputs simultaneously to be able to derive a definitive output. ANN's have been more commonly used towards image recognition and classification purposes, however DeepDream, a deep learning program developed by Google researchers in 2015 (Mordvintsev et al., 2015a, 2015b), has shown an ANN's creative potential in generating unique images with a strikingly fantastical and otherworldly quality – deemed by some as "dazzling and surreal…but also creepy" (Auerbach, 2015). What distinguishes DeepDream is the way it exploits the multiple hidden layer architecture of an ANN (which typically serve to analyse a training dataset of images and learn the quintessential features so it can ultimately classify given input images) by instead enquiring the ANN to present a visual portrayal of what features each layer has learnt of the training dataset. For example, instead of training an ANN to discern images of cats and non-cats, DeepDream asks the trained ANN to produce an image it would qualify as a cat, and furthermore, by tuning the intensity of individual hidden layers, allowing the specific features learnt by the respective layer to be visually enhanced (e.g. the cats eyes, or the silhouette of its ears), resulting in a hyperreal, undeniably unique, visual rendition of a cat. Hence, Mordvintsev et al. recognized the creative potential of ANN's to "become a tool for artists—a new way to remix visual concepts—or perhaps even shed a little light on the roots of the creative process in general" (Mordvintsev et al., 2015b). Interestingly, these creative outcomes are actually a product of the more significant revelation of being able to better understand (and visualize) what each layer of the ANN is learning about the images it is being trained on.
- Convolutional Neural Networks (CNN) are a type of ANN which are based on the same multi-layered neural network, but use "filters" to analyse and segment input data (usually images) into "feature maps", which are in turn compiled into "convolutional" and "pooling" layers, before being processed through a multi-layered neural network to generate an output. Because

of their effectiveness in processing images, CNN’s are commonly used for computer vision purposes (the competency of computers to understand visual content) (Wu, 2017) and consequently have become a popular and relevant deep learning tool for visual creative art applications. For example, many studies have applied CNN’s towards the task of artistic style classification (Lombardi, 2005; Noord et al., 2015) and image style transfer (L. Gatys et al., 2016; L. A. Gatys et al., 2016; Selim et al., 2016), demonstrating its potential use in facilitating creative art tasks.

- Generative Adversarial Networks (GAN), a deep learning model developed by Ian Goodfellow (Goodfellow et al., 2014), also caters to image data but in a unique setup: it is composed of two designated distinct models, a generator (generates images) and a discriminator (classifies images generated by generator as real or fake), set in opposition to each other. The generator’s goal is to try to deceive the discriminator by generating an image that can pass as something from the training set, and the discriminator’s goal is to catch the generator’s images as not analogous to the training set. Furthermore, the generator and discriminator are both subject to a feedback loop which confirms when they have been successful in their goals (i.e. when the generator has managed to generate an image which eludes the discriminator, or when the discriminator has managed to catch an image generated by the generator) or unsuccessful, thus they are simultaneously learning to perform their role better. What further distinguishes GAN’s from other deep learning models, as alluded to in its name, is that it is a generative model as opposed to a discriminative one. After being trained on a dataset to determine its defining features, the objective of discriminative models is to classify input data into respective categories (or labels) based on the detected features, whereas generative models do the opposite: their objective is to predict features given a certain label. To illustrate this, consider the task of isolating spam email: a discriminative model would be given an email (input data) and function by classifying it as “spam” or “non-spam” (output label), while a generative model would be specified “spam” or “non-spam” (input label), and function by composing an email that resembles the label specified (output data) (Nicholson, 2019b).

Thus, a GAN has the unique ability to generate new data based on the dataset it was trained on. This unique capability of GAN has sparked a creative computing revolution, giving rise to studies of its application to creative fields such as art, music, and writing, through which has propagated further variations of the original GAN architecture that complement the needs of respective creative fields.

Table 2: Examples of GAN variants and their application in various creative fields

Creative field	*GAN-variant name (abbreviation)*	*Author / Reference*
Visual Arts	Creative Adversarial Network (CAN)	Elgammal (2019); Elgammal et al. (2017)
	Conditional Generative Adversarial Network (CGAN)	Mirza and Osindero (2014)
	Deep Convolutional Generative Adversarial Network (DCGAN)	Radford et al. (2015)
	Style-based Generative Adversarial Network (StyleGAN)	Karras, Laine, et al. (2018)
	Wasserstein Generative Adversarial Network (WGAN)	Arjovsky et al. (2017)
	Cycle Consistent Adversarial Networks (CycleGAN)	Zhu et al. (2017)
	Large Scale GAN for High Fidelity Natural Image Synthesis (BigGAN)	Brock et al. (2018)
Music	Sequence Generative Adversarial Networks (SeqGAN)	Yu et al. (2016)
	Multi-track Sequential Generative Adversarial Networks (MuseGAN)	Dong et al. (2017)
Writing / Poetry	Sequence Generative Adversarial Networks (SeqGAN)	Yu et al. (2016)
	Text Generation via Filling in the Blank (MaskGAN)	Fedus et al. (2018)
	Generating Poetry from Images by Multi-Adversarial Training (I2P-GAN)	Liu et al. (2018)

Given its distinctive generative ability, GAN's and its variants have been widely applied to creative purposes. Some notable examples of this in the visual arts realm include: Casey Reas's use of DCGAN to create work exhibited in Compressed Cinema which showcased the ambiguous quality characteristic of GAN-generated images (DAM Gallery, 2019; Netz, 2019), Mario Klingemann initiative in re-engineering a GAN model to purposely exhibit "glitches" which "misinterpret" the input data in unexpected ways and thus produce creative results (Klingemann, 2020; Spratt, 2018b), Helena Sarin's preference in using CycleGAN for its ability in particular to accentuate the textural qualities of artistic imagery (Eyeo Festival, 2019b), and Michael Tyka's (who also worked on DeepDream) widely acclaimed "Portraits of Imaginary People", a series of surreal portraits generated by a GAN trained on thousands of portrait photos from Flickr, as well as his more recent work "EON", a mesmerizing animated composition of images generated by BigGAN (Miller, 2019; Tyka, 2019), accompanied by background music generated with neural networks (Huang et al., 2018).

The defining facility of machine learning and deep learning to “self-learn, self-evaluate and self-improve” eliminates the need to explicitly program step-by-step rules for a computer to follow (i.e. the way programming did). Thus, they are particularly advantageous with regard to the subjective nature of creative work, because subjective material is difficult to define rules for in the first place given there are usually many exceptions to the rules, and machine learning and deep learning eliminate the need to pre-define such rules as they enable computers to develop their own rules by learning from (a significant amount of) sample data on the subjective material. In fact, this autonomous learning process is reflective of how humans learn when it comes to subjective material in creative fields i.e. by developing their own inferences (i.e. rules) on the subjective material through learning “from experience” (i.e. being exposed to lots of sample data). Thus machine learning and deep learning are highly applicable when it comes to subjective matter – for example: composing music based on environmental inputs, e.g. Aitokaiku (Eerola, 2018), or music from text or images or emotions (Eyeo Festival, 2019a), or Fashion ++ Facebook “an example of how AI can be useful in a domain such as fashion, which some might think would be too creative or subjective for these systems” (Hsiao et al., 2019).

Furthermore, deep learning models in particular are conducive to exhibiting creative behavior owing to their multi-layered architecture’s unique capability to process large amounts of input data that is unstructured, un-labelled and non-linear (Alqahtani et al., 2019; Luce, 2019) – features which are representative of creative work. The capability of deep learning models to self-sufficiently decipher complex associations and context from a given dataset (DiPaola et al., 2018) makes them particularly applicable and advantageous in tackling the subjective nature of creative work, which is difficult to initially define rules for. And of course, regarding generative models such as GAN’s, their architecture is specifically designed in a way which forces unexpected and unique outcomes (Alqahtani et al., 2019; Goodfellow et al., 2014).

Another advantageous outcome of deep learning driven computational creativity is that the means in which it provides creative value is increasingly autonomous; whereby not only the product but also the process of creativity is simulated (Colton et al., 2009). While the pioneering works in computational creativity needed to be programmed explicitly to follow a human’s creative direction, the more recent developments based on machine learning and deep learning models allow a computer to self-sufficiently learn and formulate connections by processing given input data through a vast multitude networks in a iterative manner and essentially navigate its own internal decision-making process to generate an output – a framework which can both physically and conceptually be likened to the human cognitive mechanisms of creativity (DiPaola et al., 2018).

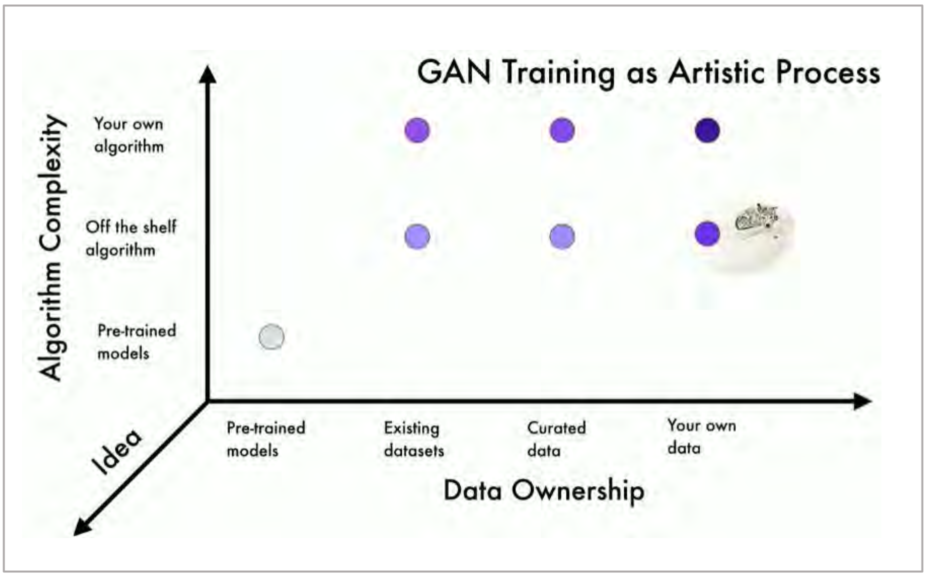
2.2.5 Conclusion / Significance of deep learning + computational creativity

Having reviewed the evolution of computational creativity, from its pioneering foundations up until its most recent developments, we conclude with an understanding of (1) the varied degrees of creative autonomy demonstrated by computational creativity throughout its evolution (2) the utility which computational creativity, in its varied degrees of creative autonomy, can offer creative practices. We have seen that the contribution of computers towards creative tasks is not new and has been established into a field of study known as Computational Creativity, which formerly manifest as [generative/algorithmic/computer] art or music, driven by programming capabilities, but in recent years has evolved towards achieving a higher degree of creative autonomy, driven by machine learning and more so deep learning. In other words, the pioneering works in computational creativity were characterized by teaching a computer the rules and having it perform based on those rules (i.e. programming), while the more recent works have been characterized by letting the computer formulate the rules themselves by providing input data and processing power (i.e. machine learning and deep learning). This distinction (as portrayed earlier in Figure 3) represents how the role of the computer has evolved in computational creativity – and the extent of creative autonomy possessed by the computer versus the human artist or programmer. For example, in the earlier works of Lillian Schwartz, Daniel Tempkin, Joan Truckenbrod, the computers were programmed explicitly to follow the artists creative intent, and so the artists were still actively involved in the iterative editing and decision-making process. While in the recent works based on deep learning models, while ultimately still programmed by a human, they aren't explicitly programmed on what to create, and instead enable the computer to navigate its own internal iterative editing and decision-making process (based on what it has learnt from test data) in generating the final work. As summarized by Elgammal (Elgammal, 2019), Harold Cohen's work by AARON "required the artist to write detailed code with a desired visual outcome in mind" and thus it was "performing tasks as directed by the artist", while machine learning empowers the computer with greater autonomy in creating, albeit still requiring a human to "curate" the dataset on which the machine is trained.

Across the formative theoretical studies of computational creativity (Boden, 2004; McCorduck, 1991; McCormack & D'Inverno, 2012; Whitelaw, 2004), even though there are varied opinions on the extent to which the exhibited creative behavior can be credited to the computer (instead of their human counterparts), there is an overarching consensus that ultimately computers have the potential to facilitate and even expand human creativity, as more than just an assistive "tool" (e.g. the way computer-aided design programs are used as tools to assist an artist in producing creative work) but as a "creative collaborator" with autonomous creative decision-making capabilities (Colton, 2012; López de Mántaras Badia, 2013; McCormack & D'Inverno, 2012, pp. v-vi). Note that although computational creativity looks at achieving higher autonomy in machine generated creativity, by embracing its role as a 'collaborator' suggests that the end goal is not to replace humans in creative roles but to facilitate them, as echoed by Elgammal (Elgammal, 2019): "…just because machines can almost autonomously produce art, it doesn't mean they will replace artists. It simply means that artists will have an additional creative tool at their disposal, one they could even collaborate with.". Therefore, whether the degree of creative autonomy achieved by computational creativity can qualify it as a curator's tool or an autonomous creator or something in between, might be an unimportant question if the superseding consensus per experts is that it can ultimately expand human creativity and introduce creative fields to new possibilities. In the words of Spratt (Spratt, 2018a), "all these applications of computer science in the arts challenge conventions surrounding the philosophy of creativity and suggest that new dimensions remain to be explored as art and music are examined and produced in radically new ways".

Regardless of the extent to which the computationally exhibited creative behavior can be credited to the computer over their human counterparts, computational creativity is already acknowledged to have potential to add creative and aesthetic value to the creative product and process by facilitating or even expanding human creativity. When it comes to machine learning and deep learning driven computational creativity, a higher degree of creative autonomy is exhibited by not needing to be explicitly programmed to perform. Some assume this equates to a passive human involvement, and thus denounce their human counterparts to be merely "curators" (of a dataset) or "collectors" (of art produced by a machine) instead of creators, according to GAN-artist Helen Sarin (Eyeo Festival, 2019b). But she argues that, on the contrary, the process of curation or collection still requires creativity, as portrayed in Figure 4, which designates "ideas" as a third dimension influencing the originality of computationally generated art. Furthermore, as pointed out by Elgammal (2019), even if they are referred to as a curator, the "pre-curation" process (i.e. of pre-selecting and pre-sorting the dataset) and the "post-curation" process (i.e. of filtering in and out the desired output and further refining the computational model) is in fact very reflective of the iterative process widely attributed to the creative design process (Asimow, 1962; Bernal et al., 2015; Gómez de Silva Garza, 2019; Lamb et al., 2018; Verganti et al., 2020).

Figure 4: Factors contributing to originality in GAN art, according to Helena Sarin (Source: Sarin, 2019. Eyeo Festival)



2.3 Computational Studies and Knitted Textiles

This section will proceed to explore the crossover of artificial intelligence and knitted textiles, via studies that apply (1) computational concepts to knitted textiles – a long-standing branch of study which encompasses conceptually mapping out the underlying technical elements of textiles, and their resultant mechanical and physical performance, based on computational models or algorithms, mostly to enable it to be represented and manipulated in computational platforms (e.g. for fabric virtual simulation purposes), and (2) modern artificial intelligence (soft computing) to knitted textiles – a burgeoning area which concerns the practical application of soft computing artificial intelligence (e.g. expert systems, machine learning algorithms...etc.) towards knitted textile industry processes.

Although the studies reviewed in this section are not purposed for exhibiting creativity, they nonetheless demonstrate a synergy between knitted textiles and computational concepts that is both relevant and conducive to this study's overarching pursuit of computational creativity in knitted textiles.

2.3.1 Introduction

The relationship between textiles and computing has been a long acknowledged and explored niche, which can be, often habitually, traced back to the jacquard loom (Elliot, 2017), an early 1800's originated textile machinery which facilitated the industrialization of weaving, and utilized a binary coded system reflective of computers, to translate woven pattern designs into machine directions that produced the subsequent woven fabric. More recently, in the last 10 years, the interactions between textiles and computing have evolved extensively in multifaceted ways that have exemplified a dynamic interplay between contrasting entities of: the physical vs. digital, traditional craft vs. modern technology, the material vs. virtual. Particularly with the COVID-19-pandemic-fuelled accelerated adoption of digital information and virtual experiences in the last 2 years, and the concurrent buzz on NFT's (non-fungible tokens) and the metaverse, there has been a heightened awareness towards the dichotomy between the physical and digital (Business of Fashion (BoF), 2021), and thus a further evolution in the relationship and potential demonstrated by the overlap of textiles and computing.

Against this backdrop, the exhibition "Interweaving Poetic Code", held from May 1st to July 18th 2021 by the Centre for Heritage, Arts and Textiles (CHAT) at the Mills in Hong Kong and directed by Taeyoon Choi, felt very relatable and timely, showcasing works by a variety of artists, coders, and technologists that incorporated computational devices and methods ("digital" entities) with traditional textile craft materials and techniques ("physical" entities), in creative ways that can inspire and also benefit society. This article will begin by providing a background on the evolving interdisciplinary space where textiles & computing intersect, followed by a retrospective overview of the exhibition's works, and will culminate in a discussion of what the works convey about the current & future significance of the intersection between textiles & computing.

2.3.2 Fundamental connections between Textiles and Computational practices

When most people think of textiles and its key categories of competences such as knitting and weaving, they often envision it as handcrafted, antiquated, and manual – and seemingly incongruent with the technological savviness associated with modern computing and programming (Kenning, 2015; Niedderer & Townsend, 2014). Although there has been a modern revival of the textile crafts movement in the last few years, and a further surge during the COVID-19 pandemic, as lockdowns prompted many to adopt new hobbies (Alter Mark, 2020; George, 2020; Kurutz, 2021), it continues to be seen mostly as a vintage hobby of hipsters, within an arts & crafts context. Few realize that, in fact, that the bulk of the textiles we encounter today are produced through highly computerized design and production processes. The now omnipresent and familiar innovation of knitted shoe uppers, instigated by Nike's Flyknit technology ("Nike Flyknit - a seamlessly knitted running shoe!," 2012), is an example that has showcased knitting in a high-tech context to the mainstream. But perhaps a more meaningful revelation is that textile crafts and computing are intrinsically and historically interrelated, having "a predigital relationship to techniques and practices now synonymous with digital media" (Kenning, 2015). Historically speaking, the original textile craft production processes and technologies largely incorporated what we now regard as contemporary computational concepts; the commonly referenced example being the woven jacquard loom, designed in 1805, which relied on a binary punch-card system to input coded pattern designs which were translated into the fabric being woven, reflective of the binary system used by modern computers to translate information (or some even deem it to be a key influence in the development of the early computers) (Davis & Davis, 2005; Elliot, 2017; Nikolovska, 2009). Also, on a fundamental structural level, textiles have computational associations in their notation and their mechanical behavior which is considered "programmable" by tuning different properties (Dimitriyev & Matsumoto, 2018; Kaldor et al., 2008; Matsumoto, 2020)). On a practical execution level, according to Boden (2019) and Sennett (2008), he seemingly unrelated practices of craft and computing have "overlapping characteristics" such as relying on attention to detail, experience, systematic instructions to operate, a degree of abstraction from physical world and the honing of a technical skill. On a philosophical level, the realization of the dynamic relationship between crafts and computing far predates our modern technological era, as it is even alluded to in Lewis Mumford's 1952 published book "Art & Technics", which argues that "in actual history, this separation [or clear line between art and technics] does not hold. Art and technics go together, sometimes influencing each other…" (Mumford, 2000). (Note, to be clear, there is a distinction between what is referred to as "art" and "craft" within this article, even though in some contexts they can be seen as on the same end of the spectrum especially in relation to computing. In this article, textiles are considered a "craft" as opposed to an "art", although examples of "art" might be referenced to exemplify a point. The distinction being that "art" is a symbolic expression of aesthetic, while "craft" is that but is also purposed to exhibit a practical function, as defined by (Mumford, 2000).

Indeed, it is largely due to these intrinsic affiliations that the integration of textiles & computational concepts has been widely utilized as means of constructionism – which theorizes that learning is most effective when facilitated by making tangible objects (Ackermann, 2001). This has manifested in the direction of applying textile crafts to benefit computational learning and expansion, by utilizing the tangible and spatial experience of constructing textile structures to facilitate the understanding of computational concepts (Davis & Davis, 2005; Gold, 2005; Piper & Townsend, 2015). An exemplification of this being Dr. Daina Taimina's use of crochet as a medium to teach the mathematical concept of hyperbolic planes (Gold, 2005; Henderson & Taimina, 2001). Thus, resonating with what Belcastro (2013) aptly expressed about the longstanding use of knitting to illustrate mathematical concepts, not only does the physicality of the textile craft product provide a good "teaching aid" for abstract concepts, but the manual and creative experience of the textile crafting process further exercises and hones an understanding of those abstract concepts. According to Richard Sennett, the making of physical things in craftmanship stimulates people to think and learn (Sennett, 2008).

In the examples mentioned so far, textiles are being incorporated to facilitate the understanding of computational concepts, yet the constructionist effect can manifest in the opposite direction as well, with computational concepts being incorporated to facilitate not only the understanding, but further the creativity, in textiles. For example, according to Knochel and Patton (2015), applying computational thinking and techniques to studio art practice encourages artists' work to expand in "interdisciplinary and open-ended ways" (Penny, 2004, 2009), and furthermore, the democratic, collaborative and open-source nature of computational code is conducive to cultivating ideas and innovation. According to (Boden, 2019), the process of defining the structure, dynamic and algorithmic languages of data can enhance an artist ability to shape artwork in more transformative ways. Indeed, the expansive creative field of computer art is in it of itself a manifestation of computing expanding the creative possibilities of art.

Several research studies have explored the intersection between knitted textiles (and the knitting process) and computational concepts and been able to derive meaningful connections. For example, the work of Matsumoto and Santos et al. acknowledges that the manipulation of yarn by traditional the textile process of knitting can both exemplify and facilitate the understanding of knot theory (the mathematical study of knots) (Matsumoto, 2019, Feb 20, 2020; Santos et al., 2019). Understanding knitting in the context of knot theory has led Matsumoto's research team to create new, unconventional stitch structures, thus expanding the creative possibilities in knitted textile design (Matsumoto, Feb 20, 2020).

Another intrinsic aspect of knitted textiles which makes them suited for the computational space is their ability to be "programmable" metamaterials. This refers to how knitted textiles (as well as woven textiles), which can be made from a non-elastic, one-dimensional yarn, yet via traditional processes such knitting (or weaving in the case of woven textiles), transform into two or even three-dimensional structures with dynamic, "tunable" mechanical performance (Dimitriyev & Matsumoto, 2018; Hook, 2019; Karmon et al., 2018; Matsumoto, 2019; Matsumoto & Mahadevan, 2015; Poincloux et al., 2018; Roberts, May 17, 2019). This innate characteristic is probably most explicable and apparent in knitted structures, where a one-dimensional non-elastic yarn when knit into a basic jersey stitch becomes a two-dimensional fabric plane which exhibits elasticity and natural curling, and by further applying simple knitting stitch manipulation techniques, known as “increasing” or “decreasing”, the formerly two-dimensional knitted fabric plane can be shaped into a three-dimensional form, exemplifying the unique attribute of knitwear to be fully-fashioned or seamless (i.e. shaped without cutting or seaming). Additionally in knitting, different types of stitch structure, of which there are myriad, produce different degrees physical and mechanical performance such as elasticity, tautness, thickness, drape, curling…etc. (Kaldor et al., 2008; Karmon et al., 2018). Even in woven fabrics, though at first glance they may not seem very mechanically dynamic, they still exhibit a degree of extensibility (particularly in the bias, diagonal, direction), and the extent of which is also determined by the type of weave, density etc. Regardless of the textile structure, whether knit or woven or other, the type of yarn quality (i.e. fiber content, yarn twist, yarn size etc.) also bears significant influence on the resulting physical and mechanical performance of the fabric. Aside from the textile structure, seaming or surface manipulation techniques, such as darts or smocking (mostly applied to wovens), are also a means of producing produce further physical dimensionality and dynamic mechanical properties. This view of textiles as a programmable instrument – which can receive input data (i.e. in the form of stitch instructions) and subsequently output varied degrees of dimensionality and movement – prompts explorations into the intersection between textiles and computation.

Furthermore, knitted textiles (their structure and design) have been acknowledged as compatible for computational interpretation in that they have historically been denoted with charts and keys that correspond to coding – a feature referenced by Matsumoto and her research team (Matsumoto, 2020; Roberts, 2019). In fact several studies have involved developing computational methodologies which translate convoluted fully-fashioned knitting operations into simple instructions interpretable for an automated knitting machine (Karmon et al., 2018; McCann et al., 2016), or translate their resulting physical appearance or mechanical response into algorithmic language interpretable by a computer (Baraff & Witkin, 1998; Kaldor et al., 2008). By establishing computational representations of knitted textile elements at the stitch level, as well as for the physical and mechanical responses the stitches produce, these studies have mostly culminated towards advancements in the simulation of textiles for virtual animation and computer simulation purposes.

2.3.3 Conclusion

The studies reviewed in this section reveal meaningful correlations between knitted textiles and computing, both at a conceptual and practical level. Yet the majority of the studies which apply computing to textiles, even those that claim to address the "design" of textiles, have a technical focus (Baraff & Witkin, 1998; Fan, 2009; Hui et al., 2011; Karthikeyan & Sztandera, 2010a, 2010b), in that their end goal of computationally mapping out the technical responses of certain textile structures is to facilitate supply chain efficiency or digital visualization i.e. a resulting functional value (Karmon et al., 2018). Few studies address the potential creative value that could result from applying computing to textiles, much less knitted textiles. Yet this section has nonetheless demonstrated an evident synergy between knitted textiles and computational concepts that is both relevant and conducive to this study's overarching pursuit of computational creativity in knitted textiles.

2.4 Knitted Textile Design Process for Fully-Fashioned Knitwear

2.4.1 Introduction

This chapter section will address the intersection between creativity and knitted textiles, by way of providing a contextual overview and mapping out both product and process of the knitted textile design in the creative fashion design. As with creative design in any industry, the one in the fashion industry is very specialized, complex and demanding (Udale, 2014), requiring that business and functional needs are to be met as much as aesthetic needs (Petre et al., 2006), and manifest in both its process and product – two facets which will be characterized respectively in the following subsections. The follow sections will address this area from both a "macro" level, being the overarching process of how the knitted textile design functions and fits into the larger picture of the fully-fashioned knitwear design process, and a "micro" level, being the underlying technical elements of knitted textiles, which a must be factored into the design process. This section of the review aims to gain practical insight into the knitted textile design process for fully-fashioned knitwear, to inform this study's objective of demonstrating real-world utility and relevance.

2.4.2 *The Creative Design Product of the Fashion Industry*

This section will proceed to a “micro” level, mapping out the underlying technical elements integral and unique to knitted textiles in fully-fashioned knitwear, and are essential to be factored into its creative design process/ allowing the pre-engineering and determining the aesthetic and functional outcome. The insight gained in this section will further inform what features the developed computationally creative method should exhibit a discernment for that will enhance the creative and practical value in its output.

Ultimately what makes the fashion industry’s creative design process so unique are the unique characteristics of the products. First of all, fashion products in general are distinct from other creative design products in that it is physically tangible and dynamic (Luce, 2019), serving not only a visual purpose but a material and functional purpose as well. This physicality of fashion products is borne in their constituent textile material – thus to understand the characteristics of a fashion product, it is necessary to drill down to the textile level.

We can use the category of knitwear as an example. Knitwear largely refers to fashion product that is made of a knitted textile material, produced by knitting, which is a fundamentally traditional textile production process that can be performed by hand or, more commonly today, by industrial knitting machines. Knitwear can generally be classified in two ways: fully-fashioned and cut & sew. If the panels of the knitwear product are knitted to shape, then it is fully-fashioned (e.g. how most heavy knit sweaters are constructed). On the other hand, if the panels of the knitwear product are cut out from knitted fabric and then sewn or pieced together, then it is known as cut & sew (e.g. how most sport t-shirts are constructed). Either way, knitwear is always composed of a knitted textile.

To further understand the characteristics of knitwear product, we must also drill down to its textile level which carries defining technical properties. By modifying these technical properties of the underlying knitted textile, the designer can ultimately shape the resulting knitwear product. These integral technical elements of knitted textiles are summarized here with respective examples:

(1) Stitch Type / Movement:

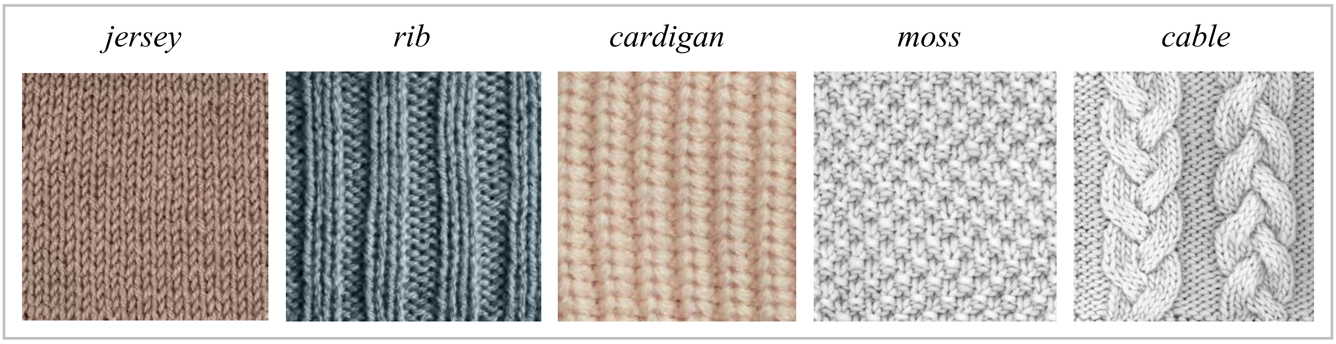
- Tuck
- Knit
- Float
- Transfer (front or back) / Racking (left or right)
- Split

- Cast Off

(2) Stitch Structure: e.g.

- Jersey / Reverse Jersey
- Rib (e.g. 1x1, 2x2, 2x3…)
- Full / Half Cardigan
- Full / Half Milano
- Moss
- Cable
- Intarsia
- Pointelle
- Double Knit
- Jacquard
- Plaited
- Inlay
- Links-Links / Garter
- Ottoman

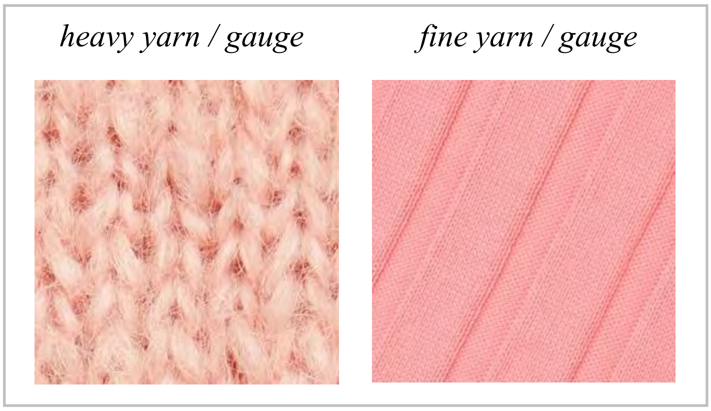
Figure 5: Image examples of various stitch structures



(3) Yarn Size / Knitting Gauge:

- Size: e.g. 2/60 NM, 2/48 NM, 1/2.3 NM, 20000 NM
- Gauge: 1.5gg – 18gg

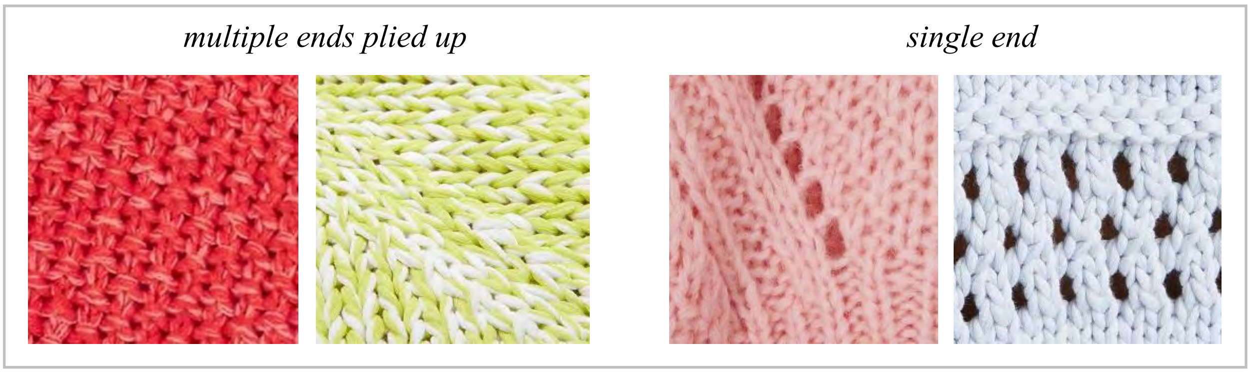
Figure 6: Image examples of various yarn size / knitting gauges



(4) Yarn Ends / Plys:

- e.g. 12gg 2 ends 2/48 NM, 2-ply marled yarn, pre-twisted yarns

Figure 7: Image examples of yarn ends / ply variations



(5) Yarn Quality / Handfeel:

- Quality: e.g. fiber content
- Handfeel: e.g. warm, dry, wet, cool, lofty, soft, itchy (subjective)

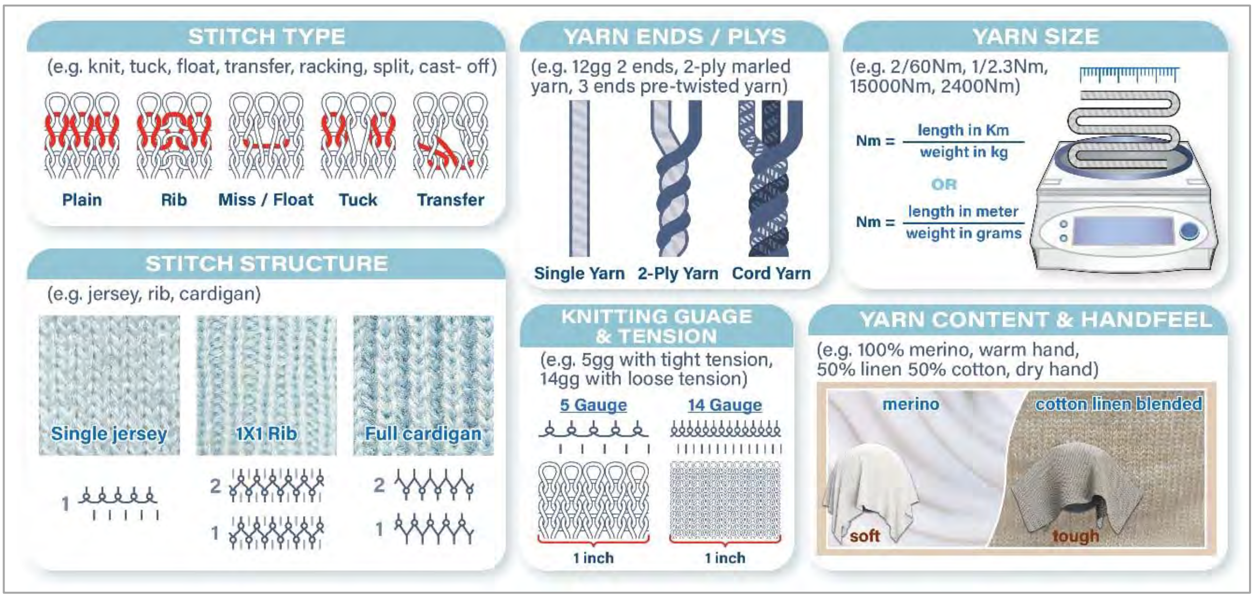
Figure 8: Image examples of hand feel variations

(6) Tension: e.g.

Figure 9: Image examples of variation in tension

A summary of the knitted textile technical elements is displayed in Figure 10. Thus textiles consist of a unique array of tunable technical variables can determine everything from its aesthetic appearance to its functional performance, providing an expansive creative canvas for a highly versatile, dimensional and kinetic material, but also bears a complexity that demands specialized technical grasp, spatial reasoning and pre-emptive intentionality in the creative design process(Francis & Sparkes, 2011; Kaldor et al., 2008; Petre et al., 2006; Santos et al., 2019; Udale, 2014).

Figure 10: Technical elements of knitted textiles



As summarized by Udale (2014), knitted textiles exhibit the unique characteristic whereby "each brick builds upon others to become a three-dimensional structure, as stitches combine to create a garment. Knitwear is one of the few design disciplines in which the designer has complete control of the product they are designing and making, first creating the knitted fabric from yarn, and then developing the fabric into the finished knitwear piece.".

In addition to textiles enabling physical and mechanical performance to be pre-configured via its technical variables, its formation from a one-dimensional yarn into a dimensional and kinetic structure (via textile production processes such as weaving and knitting) furthermore make it a "programmable metamaterial" (Dimitriyev & Matsumoto, 2018; Matsumoto & Mahadevan, 2015; Poincloux et al., 2018). This is illustrated more obviously by knitted textiles, whereby a one-dimensional non-elastic yarn when knit into a basic jersey stitch becomes a two-dimensional fabric plane which exhibits elasticity and natural curling, and by further applying simple knitting stitch manipulation techniques, known as "increasing" or "decreasing", the formerly two-dimensional knitted fabric plane can be shaped into a three-dimensional form, exemplifying the unique attribute of knitwear to be fully-fashioned or seamless (i.e. shaped without cutting or seaming). Additionally, different types of stitch structure in knitting, of which there are myriad, produce different degrees physical and mechanical performance such as elasticity, tautness, thickness, drape, curling…etc. (Kaldor et al., 2008; Karmon et al., 2018). Even in woven textiles, though at first glance they may not seem very mechanically dynamic, they still exhibit a degree of extensibility (particularly in the bias, diagonal, direction), and the extent of which is also determined by the type of weave, density etc. And whether a knit or woven textile, the type of yarn quality (i.e. fiber content, yarn twist, yarn size etc.) also bears significant influence on the resulting physical and mechanical performance of the fabric. Aside from the textile structure, seaming or surface manipulation techniques, such as darts or smocking, are also a means of producing produce further physical dimensionality and dynamic mechanical properties. This view of textiles as a programmable medium has consequently made it an ideal subject for computational modelling and assimilations. Knitted textiles (their structure and design) have especially been acknowledged as compatible for computational assimilation in that they have historically been denoted with charts and keys that correspond to coding (Matsumoto, 2020; Roberts, 2019). In fact several existing studies have involved developing computational methodologies which translate convoluted fully-fashioned knitting operations into simple instructions interpretable for an automated knitting machine (Karmon et al., 2018; McCann et al., 2016), or translate their resulting physical appearance or mechanical response into algorithmic language interpretable by a computer (Baraff & Witkin, 1998; Kaldor et al., 2008). By establishing computational representations of knitted textile elements at the stitch level, as well as for the physical and mechanical responses the stitches produce, these studies have mostly culminated towards advancements in the simulation of textiles for virtual animation and computer simulation purposes.

2.4.3 The Creative Design Process of the Fashion Industry

Having looked into characteristics of the products of the creative design process, this section will proceed to look at the characteristics of its process. Specifically, it will outline the knitted textile design process first in the context of the overall fashion (apparel) design & product development process, and then in and of itself.

In order to cater to the highly dynamic, dimensional characteristics of the fashion industry's typical textile-based product as described in the previous section, the respective creative design process is also very complex, specialized, and demanding. To best convey the specific details of these complexities, this section will focus on the creative design process specifically for knitted textile product, which is a very nuanced and specialized sector in the fashion field, with unique aspects that distinguish it from the more commonly discussed apparel product categories of wovens or cut & sew.

Distinguishing characteristics of a standard* creative design process in the fashion industry are detailed below in written form, while simultaneously represented in visual form via Figure 11 & Figure 12, which can be cross-referenced to provide a more thorough understanding. Figure 11 outlines the overall fashion design & product development process, while Figure 12 zooms in to outline the processes within just the creative design stage. Both figures use the graphical logic and same color coding scheme: the vertical (up or down) directions of arrows represents the chronological progression of stages in the process and workflow (which for example can sometimes back-propagate), while horizontally (left to right) represents how the process differentiates based on type of fashion product category (the left most column in orange shades represents fully fashioned knitwear, the right most column in green shades represents wovens or cut & sew, and the middle column in blue shades represent overarching standard process timeline). (*Note: although attempting to be a "standard" portrayal of the fashion industry's creative design process, note the nuances can deviate and especially can be subject to even greater deviations in extraordinary circumstances, one resonant example being the 2020 COVID-19 pandemic which forced extreme adjustments to the entire fashion value chain processes).

- knitted textile design is pivotal to the knitwear creative design process: the textile material is an integral element for all fashion product, but it is particularly formative and pivotal for fully-fashioned knitwear, mainly because both its textile "fabric" and garment take shape simultaneously during the knitting production process, unlike with woven product whose textile fabric is pre-developed and procured as a separate entity (usually on a roll or bolt) and cut & sewn from to make the product. In other words, knitwear designers start off sourcing yarn as a raw material, without a formed reference of what the textile fabric will be like, whereas woven designers have the benefit of formed textile fabric to reference when sourcing their raw material. This ultimately means the fully-fashioned knitwear creative design process needs to accommodate the added task of having to design the textile fabric before designing the silhouette of the product: hence the knitted textile design (or more commonly referred to in the industry as "knit-down" or "swatch" development) stage plays a predominant role in the fully-fashioned knitwear creative design process (as conveyed in Figure 11 & Figure 12). Establishing the knitted textile design is a priority which precedes the design of other elements for both creative reasons (since the raw material starts in yarn form instead of fabric form which the designer can leverage to shape the aesthetic and functional outcome), as well as practical reasons (because timing and logistical circumstances require the yarn raw material to be ordered far in advance to enable enough time to develop, manufacture and deliver it as a textile fabric).

- iterative and repetitive process: as conveyed by the multiple backtracking arrows in Figure 11 & Figure 12, the creative design process for knitwear can, on several occasions, require revisiting the knitted textile design (or knit-down or swatch development) stage of the initial design conception when product additions, edits or options are put into work. This iterative and repetitive nature of the knitwear creative design process is a shared characteristic of creative design processes in general (Asimow, 1962; Verganti et al., 2020) yet because it operates under unique circumstances of the knitwear process, it manifests in uniquely challenging ways – the main being that it causes added workload strain and multiplies the expenditure of resources, including human, time and material resources (Wynn & Eckert, 2017). Aside from the overall process flow being iterative and repetitive, the cognitive process and actions which take place within most stages of the knitwear creative design process manifest a very experimental and "exploratory" behaviour (Udale, 2014) – thus can also be considered iterative and repetitive.
- tight timeline / fast turnaround: the knitwear creative design process, along with the fashion creative design process in general, operates on a comparatively tighter, more compressed timeline and a faster product turnaround time, mainly due to the seasonal and trend based nature of fashion product (Pitimaneeyakul et al., 2004).
- subject to cross-functional needs: in the industry, the knitwear creative design process operates in constant synergy with multiple other cross-functional teams, therefore on top of factoring in aesthetic needs, it also needs to factor in various other cross-functional needs, which can concern aspects like the cost, logistics, quality, merchandising, production, or marketing of the product. This furthermore means that every iterative or repetitive move in the process ultimately causes offshoot impacts on various cross-functional team processes as well (that are beyond the captured scope of Figure 11 & Figure 12).
- heavy reliance on physical prototypes (samples): more so than many other creative design processes, the fashion creative design process often involves, at multiple stages, producing physical prototypes (or more commonly referred to in the industry as "samples") of the interim textile or garment design in progress, which mainly serve to provide a more accurate visualization or cost quote of the end product to inform decisions (LaBat & Sokolowski, 1999; Pitimaneeyakul et al., 2004). Of course, for any creative design process where the end product is a physical artifact or product, the need for physical prototypes is not uncommon, however especially in the knitwear creative design process, where swatch development is so crucial to visualizing and designing the fabric quality of the product (which is highly unpredictable given all the technical variables of knitted textiles) (Karmon et al., 2018), thus physical prototypes

(in swatch or garment sample form) have notably a more habitual and embedded presence, to the point where companies have in-house sample rooms or hire people to hand knit swatches, in order to procure prototypes as quickly as possible. The advancement of 3D printing has also opened up a new means to procure prototypes more instantaneously, particularly for hard fashion products such as accessories and footwear (Vanderploeg et al., 2017). All this speaks to the heavy reliance the fashion creative design process has on physical prototypes to inform design decisions, which has proven to be an obstacle for the integration of digitization, computer-aided design or artificial intelligence tools, as alluded to by studies (Pitimaneeyakul et al., 2004). Although digitization, computer-aided design and artificial intelligence tools have certainly to some extent been adopted by the knitwear creative design process (Francis & Sparkes, 2011), however there is still a strenuous and ultimately unsustainable reliance on physical samples and swatches for decision-making, posing an environmental impact which is further exacerbated by the iterative and repetitive nature of the process. By shifting towards the digital representation of physical prototypes, such as the use of 3D virtual fit & sampling programs, helps diminish the need for physical samples and consequently help to minimize the environmental impact of the fashion creative design process.

- streamlining of complex design communication: the fashion and knitwear creative design process involves a complex network of interactions (both internally, between various cross-functional teams within an organization, as well as externally, with suppliers or partners outside the organization oftentimes on an international scale), where a streamlined exchange or communication of design information is vital for the creative design process to function effectively and result in successful end-product. Furthermore it knitwear is notably more challenging to convey because it bears specific technical and spatial complexities (Eckert et al., 2000). Thus it is important to incorporate tools & systems in the knitwear creative design process which can facilitate the streamlined communication of design information as well as cater to the complexities of knitwear. This is where computational tools & systems have been playing a vital role in but have the opportunity to play a greater one. For example, now computer-aided-design (CAD) programs cover a wide range of functions in the fashion or knitwear creative design process to utilize, such as: creative visualization (e.g. Adobe Photoshop and Illustrator), technical pattern design development & 3D sampling (e.g. Optitex, Gerber, or Lectra's software, Stoll's M1plus or Shima Seiki's SDS-ONE APEX), style information management (i.e. Product Data Management (PDM) or Product Lifecycle Management (PLM) systems). In facilitating this wide scope of functions, CAD tools have spurred the digitization of design information (such as sketches, patterns, photos) – which in turn has helped streamline the exchange of that information across the complex network of communication channels in the creative design process, particularly in terms of saving time and material resources. However, adopting many different computational tools & systems, if not synchronized well, can even further convolute the process into requiring more work to deal with, hence there remains opportunity to incorporate computational tools & systems more seamlessly into the process. Furthermore, especially with the latest advancements in artificial intelligence, there remains opportunity to expand the current computational tool & systems in the fashion and knitwear creative design process to include those newer technologies and help further streamline design communication.

Next, Figure 12 zooms in on the knitted textile design stage of the creative design. Points to note:

- It does not include printed knitted or woven bases which adds an additional layer of complexity in terms of development / review / approval process, due to more leadtime and workload.
- Note that labdips are also put into work simultaneously for every yarn used for the knitdowns that has potential to go to bulk, therefore an additional layer for liability and workload.

Figure 11: Flowchart outlining the overall fashion Design & Product Development Process

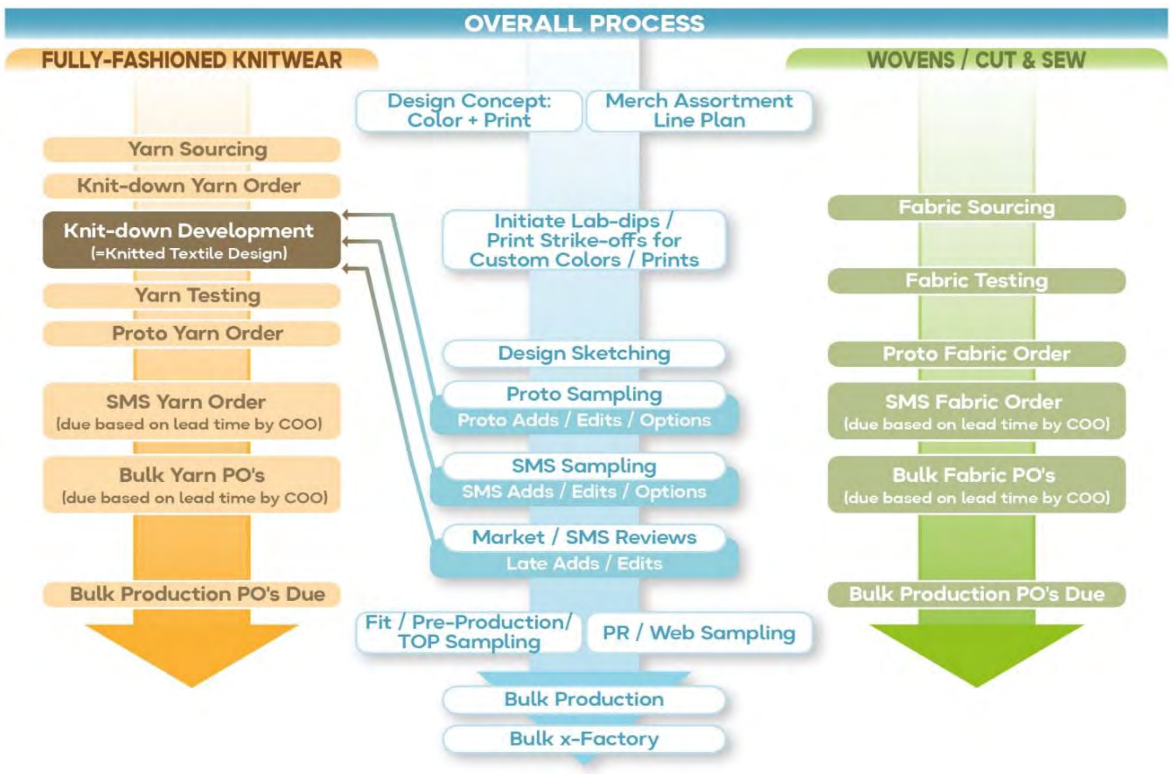
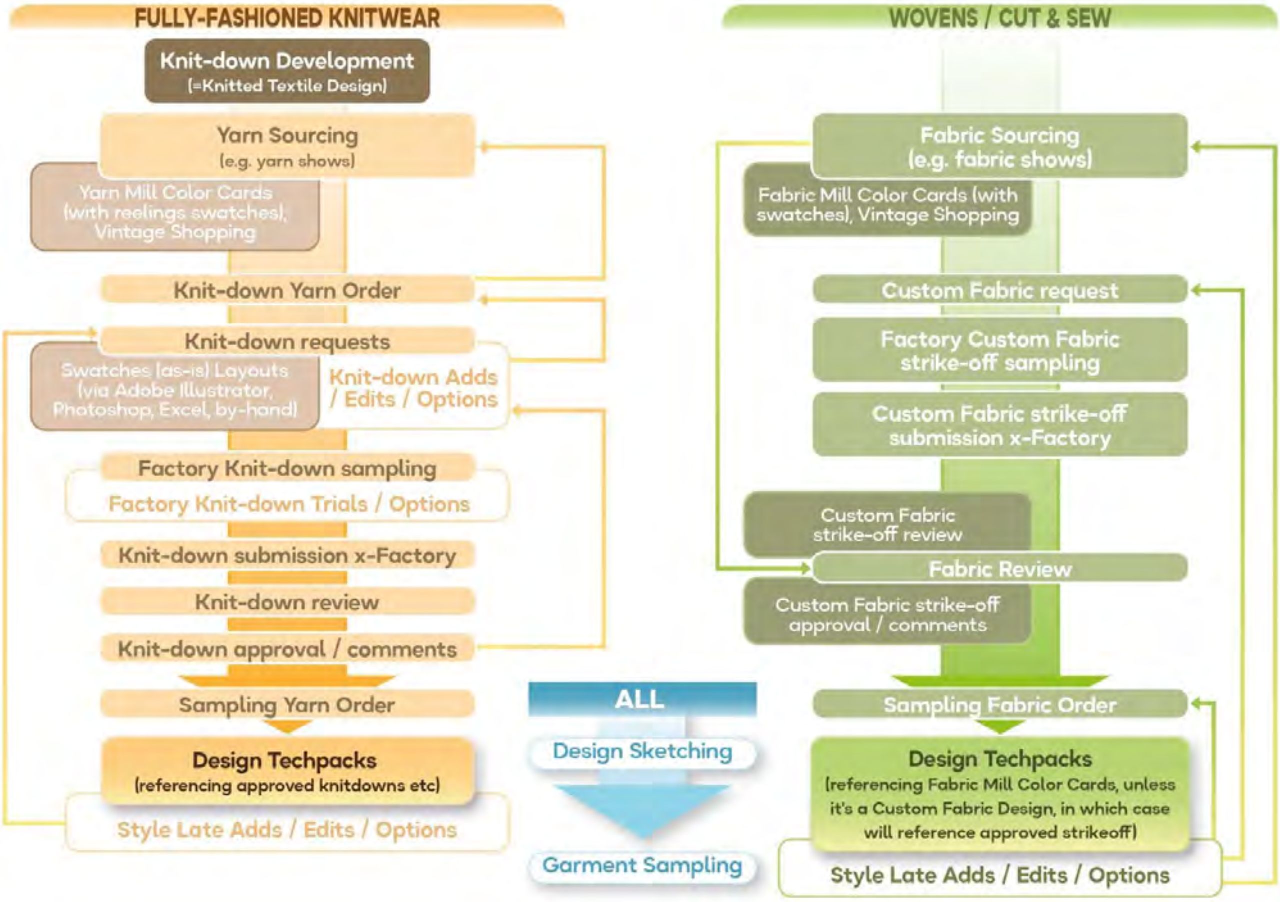


Figure 12: Flowchart outlining the Knitted textile design stage within the fashion Creative Design Process



2.5 Deep Learning driven Computational Creativity for Knitted Textile Design in the creative Fashion Design process

2.5.1 Introduction

The field of artificial intelligence, originally founded in the 1950's (Warwick, 2012), has experienced a major resurgence in the last 10 years manifest in academia and industries (Shoham, December 2018), fueled by the exponential growth of both computational power and data supply (Chui, 2018; Dongarra, 2004; Kleiner Perkins Caufield & Byers, 2018). As a result, artificial intelligence has expanded beyond the context of computer science, gradually becoming a widespread interdisciplinary tool adopted by various industries and academic disciplines (Bughin, 2017) .

The field of fashion (used throughout this study to encompass the textiles & apparel value chain), although regarded as inherently creative, design-driven, and seemingly incompatible with something as mechanical as artificial intelligence, has nonetheless felt the transformative and pervasive impact of artificial intelligence throughout its value chain, manifest in both the industry (Abnett, 2016b; Business of Fashion (BoF) & Mckinsey & Company, 2017; Luce, 2019; Nayak & Padhye, 2018; Standish, 2018), as well as in academia (exemplified in Figure 13 which captures the notable rise in output of related scholarly literature in the last 10 years – albeit dwarfed by the overall output of scholarly literature on artificial intelligence in general inclusive of other fields, as shown in Figure 14).

Figure 13: Quantity of scholarly literature published annually between 1986-2019 on artificial intelligence in the field of fashion (based on a Scopus search conducted on Apr 21 2020)

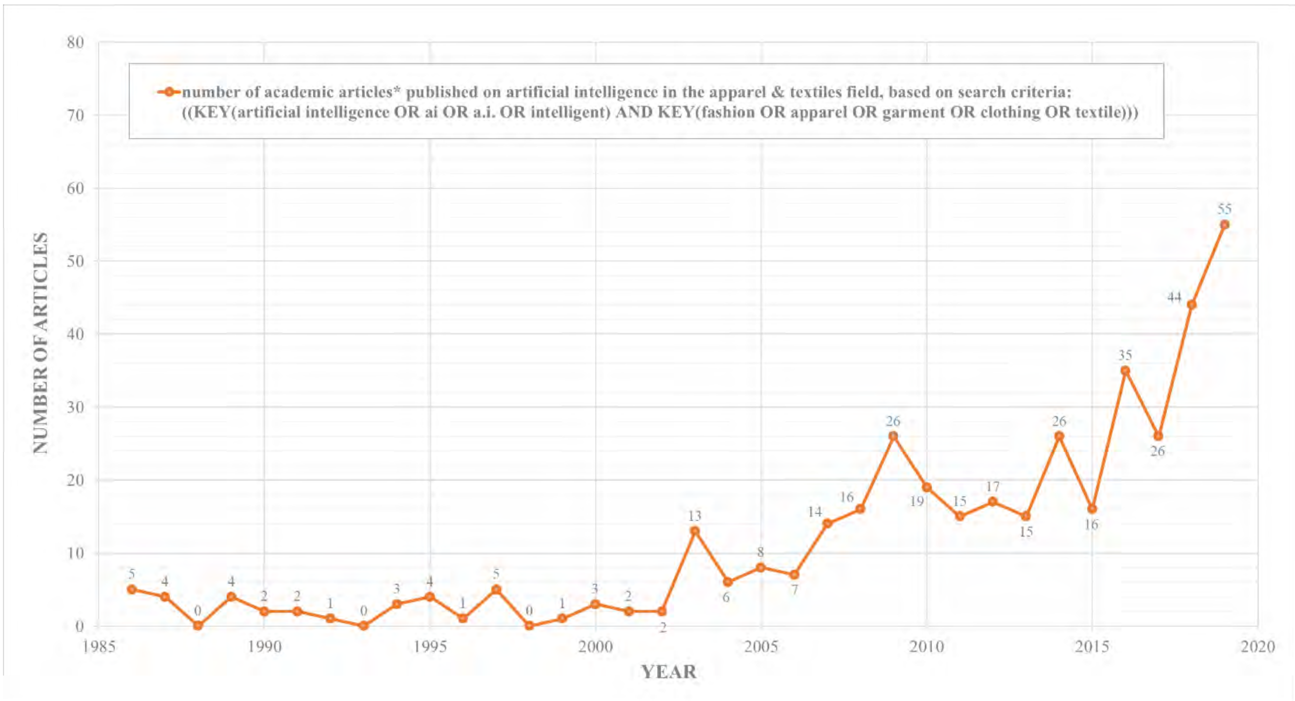
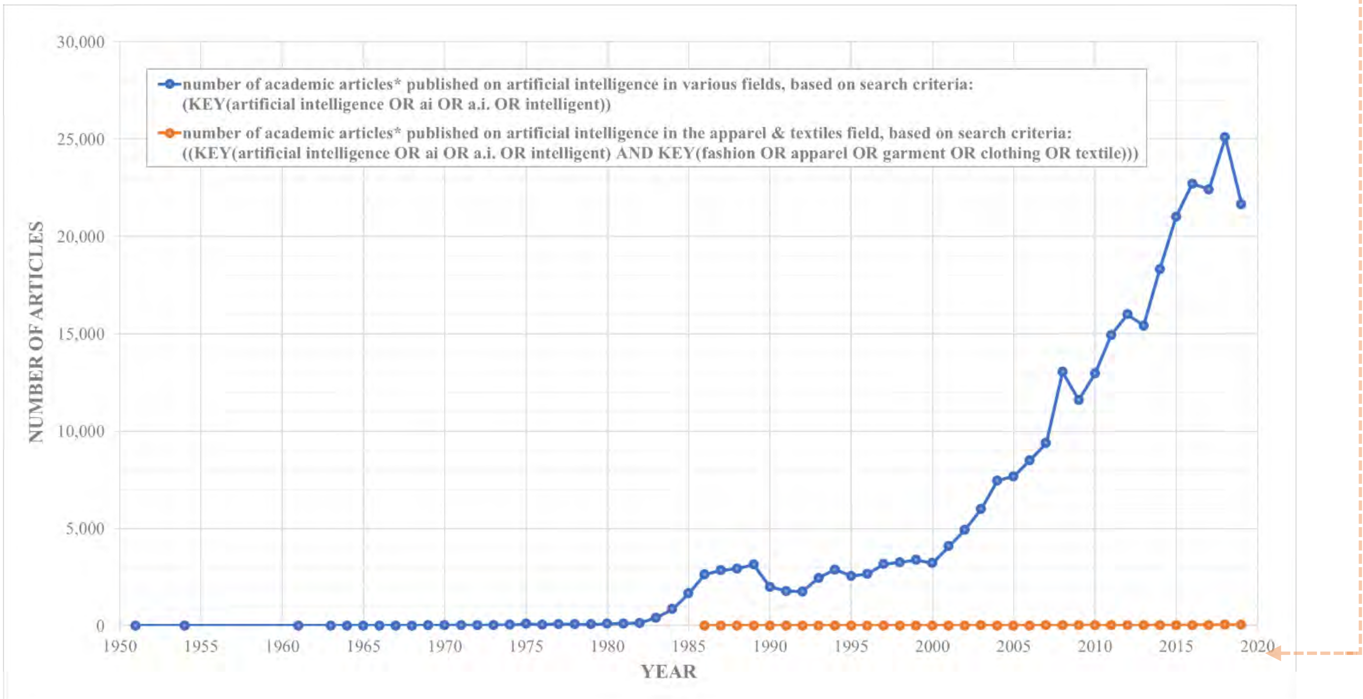
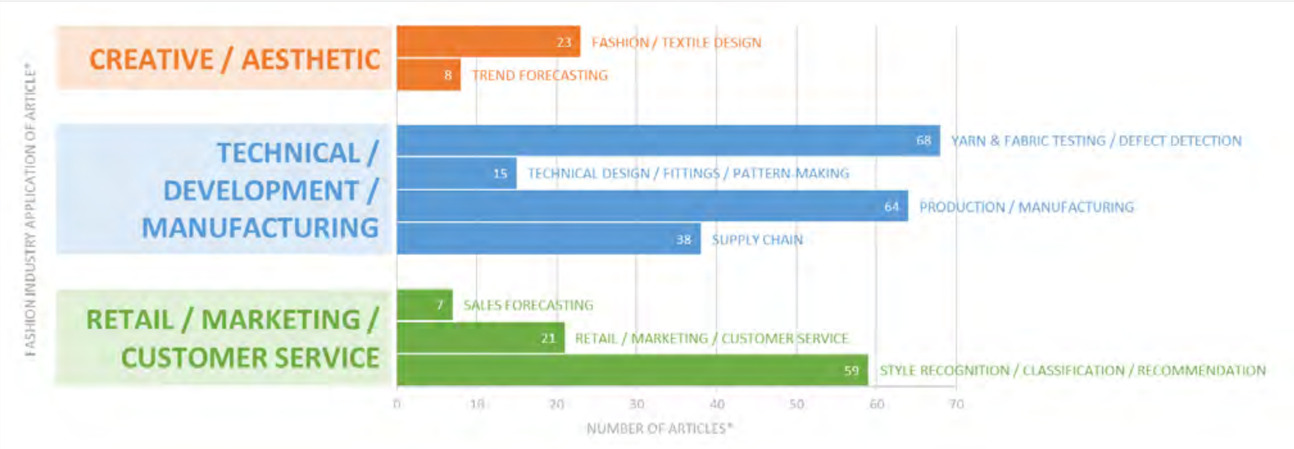


Figure 14: Quantity of scholarly literature published annually between 1951-2019 on artificial intelligence in various fields versus in the fashion field (based on a Scopus search conducted on Apr 21 2020)



Yet, despite the proclaimed hype of artificial intelligence's pervasive impact across the fashion value chain, in reality its practical adoption at an industrial or commercial scale has been limited to select pioneers and select functions such as "demand forecasting, operations automation, and customer experience enhancement" (e.g. online fashion product recommendations, which is the most tangible, familiar application of artificial intelligence in the fashion industry), while outside of those functions, it remains predominately an exploratory tool with inconsistent performance (ALOOH, 2019; Berg et al., 2020; Business of Fashion (BoF) & Mckinsey & Company, 2017, pp. 60-61; Luce, 2019) . Similarly in academia, publications on fashion-related applications of artificial intelligence are weighted towards the technical and business based functions over the creative based ones (as captured in Figure 15, which note is based on the same sampling of publications captured previously in Figure 13).

Figure 15: Distribution of scholarly literature published between 1986-2019 on artificial intelligence in the apparel & textile field, by fashion industry application (based on a Scopus database search conducted on Apr 21 2020)



Furthermore, of the comparatively limited examples of artificial intelligence academic research studies that pertain to the creative design functions of the fashion value chain, the focus is largely geared towards the style, silhouette and shape attributes of the design (Hsiao et al., 2019; Kemeny, 2018; Kim & Cho, 2000; Mok et al., 2013; Mok et al., 2016; Sbai et al., 2018; Tabatabaei Anaraki, 2017), or towards the two-dimensional visual surface elements of the design such as the pattern, print, texture (Cui et al., 2018; Kim et al., 2007; Sbai et al., 2018), color (Gu & Liu, 2010) or branding (Li et al., 2010), or towards fashion item recommendations purposed as a tool for retail instead of creative design (Bulgun et al., 2015; Liu et al., 2019; Wang et al., 2016; Yildirim et al., 2019). Even examples of artistic endeavors outside of academia, which have showcased the creative potential of artificial intelligence (in particular deep learning models known as neural networks) towards generating runway-worthy designs, have not experimented with variables beyond basically the color and silhouette of the garment or outfit. For example, Project Muze (a collaboration between Google and fashion online retailer Zalando) which developed a neural network driven “predictive design engine” that harnessed customer data to inform its fashion designs (Google, 2017; Rietze, 2016), or artist Robbie Barrat’s use of neural networks to generate new runway looks after having been trained on an amalgamation of fashion imagery of the high-end designer label Balenciaga (AIArtists.org, 2019; Schwab, 2018), and most recently DeepVogue, a fashion design system developed by China’s Shenlan Technology using DeepBlue artificial intelligence technology, was awarded 2nd place at the 2019 China International Fashion Design Innovation Competition showing the capability of artificial intelligence to generate runway worthy designs (Economic Daily: China Economic Net, 2019). Likewise, the small but budding crop of commercial fashion initiatives that have integrated artificial intelligence practically towards the creative design process, have largely adapted it to address the shallow surface-level attributes such as style class or outward garment attributes such as size, shape, fabric, color, print. Stitch Fix is a proverbially referenced example of this, having based their entire business model on data science, including their process of designing new styles – which is driven by machine learning algorithms that determine optimal style attributes based on customer data (Colson et al., 2017; Wilson et al., 2016). At start-up fashion brand Spirit & Glitch, founder, artist and engineer, Alex Maki-Jokela, uses a capability of neural networks known as “style transfer” to create the graphic prints for the brand’s apparel (Luce, 2018).

Hence, from academia to artistic ventures to commercial industry, the scope manifest by existing creative fashion design artificial intelligence endeavors has been largely focused on the two-dimensional visual elements of fashion design (such as style, silhouette, shape, print, pattern, texture, color and branding), without going deeper to address the underlying three-dimensional technical elements of the base textile material (such as yarn size, yarn composition, weave or knit structure, wash and finish). This might seem natural – to assume that creative fashion design only concerns the visual elements while the technical elements are beyond its scope – however this is an oversimplified, generalized assumption which conflicts with the reality of the standard creative fashion design process, and furthermore limits the real-world utility and relevance of the outcomes of these existing studies. Because in the reality, the technical elements of the textile are pivotal to the fashion design, and precedes the consideration of style, silhouette, shape, color, print or pattern, because they strongly dictate both the aesthetic appearance and functional performance (e.g. comfort, durability, sustainability) of the end-product (and furthermore because timing and logistical conditions require raw materials to be projected and booked far in advance of the creative design conception to protect on-time delivery of the end-product).

This reality, of the pivotal role the technical textile elements play in fashion design, is especially the case when it comes to fully-fashioned knitwear (compared to its woven or cut-&-sew counterparts): as fully-fashioned knitwear bears the unique trait in that both textile and garment take form simultaneously within the knitting production process, and it offers an array of tunable technical variables (e.g. stitch, tension, gauge) that can affect everything from form to elasticity to hand feel. This unique trait provides an expansive creative canvas but also demands more intentionality in the textile design & development stage – to 'pre-engineer' the technical variables of the textile in an effective way that produces desired aesthetic and functional outcomes in the final fashion design.

As existing examples have shown, there is still opportunity for artificial intelligence to be applied to creative fashion design in a way which better assimilates its practical needs and processes, especially when it comes to knitwear. Specifically, there is an opportunity to extend beyond the two-dimensional visual elements stereotypically associated with fashion designing, and strategically address the underlying technical elements of knitted textiles integral to fully-fashioned knitwear, and overall to be directly informed by input from current fashion industry professionals. Tackling this opportunity will ultimately help future developments produce greater real-world utility and relevance, instead of just momentary hype.

Thus, situated within the nuanced intersection between creativity, artificial intelligence and knitted textiles, the overarching purpose of this review is to explore the potential for computational creativity in knitted textile design, in the context of the real-world creative fashion design process for fully-fashioned knitwear.

2.5.2 Applications of Deep Learning driven Computational Creativity for Creative Design in Fashion

The fashion industry has in recent years experienced a wave of initiatives implementing machine learning and deep learning driven AI to facilitate its creative design functions (Abnett, 2016b; Beckwith, 2019; Business of Fashion (BoF) & Mckinsey & Company, 2017; Luce, 2019; Standish, 2018). However, it should be noted that the applications of AI for creative design functions pars in comparison to its practical application for other sectors of the fashion industry, such as manufacturing and retail (Berg et al., 2020; Business of Fashion (BoF) & Mckinsey & Company, 2017, pp. 60-61; Lee, 2020; Luce, 2019).

In exploring the (albeit comparatively limited) examples of academic studies that pertain to applications of AI for creative fashion design product generation, it becomes apparent that the focus is largely geared towards the product's superficial level elements, such as style, silhouette, and shape. Examples of earlier attempts incorporated a method of evolutionary computing known as Interactive Genetic Algorithms (IGA), that was at the time popular for creative tasks, to develop computer-aided fashion systems for generating rudimentary looking models or sketches of garment designs or technical patterns (Cho, 2002; Kim & Cho, 2000; Mok et al., 2013; Tabatabaei Anaraki, 2017; Xu et al., 2016). While more recent attempts evolved in leveraging the creative potential of deep learning neural network models (Kim et al., 2007), such as GANs in particular (Cui et al., 2018; Kemeny, 2018; Sbai et al., 2018; Wu et al., 2020; Yang et al., 2021; Yuan & Moghaddam, 2020), their focus has remained limited to the two-dimensional surface elements of the fashion design such as the shape (silhouette), graphic pattern, print and color. Otherwise, in another prominent category of studies, the focus has gravitated towards fashion product or outfit recommendations based on overall style attributes, which has incorporated computational methods including, a combined Genetic Algorithm and neural network method (Bulgun et al., 2015), ANNs (Wang et al., 2016), a combined CNN and Recurrent Neural Network (RNN) method (Li et al., 2017) and GANs (Hsiao et al., 2019; Liu et al., 2019; Yildirim et al., 2019). Therefore collectively the focus of academic studies seems limited to the product's basic style elements.

Even examples outside of academia, in recreational or commercial contexts, which have showcased the creative potential of artificial intelligence in generating fashion designs, have primarily experimented with color, graphic print and silhouette, for example: Project Muze (a collaboration between Google and fashion online retailer Zalando) which developed a neural network driven "predictive design engine" that harnessed customer data to generate fashion designs (Google, 2017; Rietze, 2016), or artist Robbie Barrat's use of neural networks trained on images of runway styles from designer label Balenciaga to generate new looks (AIArtists.org, 2019; Schwab, 2018), or DeepVogue, a deep learning based design system developed by China's Shenlan Technology which was used towards creating runway worthy designs (Economic Daily: China Economic Net, 2019), or the online personal styling company Stitch Fix, known for basing their entire business model on machine learning algorithms that determine optimal solutions based on customer data (Colson et al., 2017; Wilson et al., 2016), or start-up fashion brand Spirit & Glitch, whose founder uses a capability of neural networks known as "style transfer" to create the graphic prints for the brand's apparel (Luce, 2018).

Overall these works towards deep learning driven computational creativity in fashion creative design, whether from academia, commercial or recreational outlets, reveals an apparent focus towards the two-dimensional superficial elements of fashion product (such as style, silhouette, graphic pattern, print, color), and consequently, a lack of examples that address the technical attributes of the underlying textile material (e.g. yarn quality or textile structure), even though they are such defining variables to consider in the creative design of a fashion product (especially when it comes to the characteristically spatial and technical products of knitwear, as previously detailed in Section 2.2.1). Indeed, there are studies which implement advanced computational methods towards the textile's technical attributes, but the majority of them are not within a generative, creative design context and instead are aimed towards technical or production purposes, such as: yarn, fabric or garment engineering (Fan, 2009), the detection of yarn or fabric properties (Kumar, 2008; Muhammad Ather Iqbal et al., 2020; Xiao et al., 2018), the modelling of textile properties for 2D/3D fabric simulation (Baraff & Witkin, 1998; Kaldor et al., 2008), or bridging textile manufacturing instructions (Karmon et al., 2018; Kaspar, Makatura, et al., 2019; Kaspar, Oh, et al., 2019; McCann et al., 2016; Strange Loop, 2016). The limited studies which come closest to applying computational creativity to the textile's technical attributes with a creative design intent (even though they don't explicitly state it as such, some of their underlying functionalities could be applied to the fashion creative design process), include that of Ekárt (2007) which applies evolutionary behavior of genetic algorithms to enable the evolution of knitted textile stitch design, or that of Karmon et al. (2018) which develops a parametric computer-aided design tool to support the digital visualization, design and manufacture of knitted textiles, or that of Richards and Ekárt (2010) which proposes a computer-aided design tool modelled on case-based reasoning that facilitates knitwear pattern development down to the stitch level. Although these examples come closest to manifesting textile-conscious computational creativity for the fashion design process, note that, aside from that by (Ekárt, 2007), there are more so ascribed to what the industry refers to as the technical development stages of the fashion design process, instead of its creative design generation stages.

2.5.2.1 Literature Review Matrix

The following matrix is a compilation of the literature reviewed in this chapter which focuses on AI driven computational creativity in the creative fashion design process. It analyses and describes each literature in terms of the AI driven computational model or method adopted, the intended end-use application in the creative design process, the fashion elements / attributes addressed, and the degree of autonomy aimed for.

Publication reference (Author / Year)	Computational / AI method	Intended Applications / End Users	Product Attributes addressed	Degree of Autonomy	Comments
Kim and Cho (2000)	IGA (Interactive Genetic Algorithm)	Fashion Design Aid system (for non-professionals)	Silhouette, Shape, Style, Trim, Color	"interactive"	- over-simplified interpretation of fashion design limited to "silhouette, detail and trimming" - subjective evaluation based on "cool" and "splendid" - IGA incorporates user preferences
Wang et al. (2001)	ANN (Artificial Neural Network)	Pattern Design Intelligent Interface (to aid pattern design exploration & inspiration)	Pattern	"semiactive partner" to provide inspiration for / "stimulate or impact designers creativity"	- "semiactive partner" to designers to aid exploration and inspiration - trains based on "psychological" factors, but can be subjective - transformation / synthesis from adjusting psychological differentials is just using simple graphical distortion tools – without relating to the pattern attributes – results feel too arbitrary and distorted
Cho (2002)	IGA	Fashion Design Aid system / Content based Image retrieval system (for non-professionals)	Shape, Style, Color / Color, Texture, Shape, Relationship of objects	"interactive", / image feature extraction "semi automatic" or "automatic"	- IGA interacts with human user, learning their emotions/ preferences, to optimize outcome towards better designs - inaccurate / oversimplified interpretation of fashion design - does not produce effective outcomes for fashion non-professionals - encoded general shape/style attributes only - subjective test feels arbitrary
Kim et al. (2007)	ANN	Emotion based Textile pattern classification (for Textile industry & E-business, to help pattern designer)	Textile Pattern	"help pattern designer"	- small survey sample size of 20 subjects to for emotion-pattern correlation - focused on graphic pattern and not textile structure

Mok et al. (2013)	IGA	Customized fashion design support system (for non-professional / customer use) that outputs technical sketch	2D Fashion Design Technical Sketch (with Style, Silhouette, Trim details)	"interactive" & "user-friendly" for non-professionals / customers	- empowers non-professionals / customers to create custom fashion designs - generates 2D technical design sketch but accommodates integration with pattern making / 3D visualization tools - limited to certain style/ silhouette/ trim design elements - create knowledge model based on design parametric model to ensure designs are practical/functional - limited newness / creativity of generated designs
Bulgun et al. (2015)	GA + ANN + PSO (Particle Swarm Optimization)	Intelligent Fashion Styling / Outfit recommendati on system for varied body size/ shapes (to facilitate fashion designers or for in-store and online sales)	Garment attributes (e.g. Body, Style, Length, Color, Fabric weight, Print/ Pattern), Female Body Shape	"intelligent system" & "decision support tool"	- accounts for only 4 female body shape categories, and 15 outfit elements
Wang et al. (2016)	ANN	Fashion Styling system (that recommends outfit combinations + inform shopping decisions)	Style Genre, Occasion/ End-Use, Clothing Category, Color, Size, Shape, Silhouette Details, Fabric Content, Design Detail, Outfit Combination	"intelligent system" facilitating "interaction between consumers and companies"	- limited to 6 style genres and 4 occasion categories - pairs existing styles (of apparel and shoes), not creating new styles - limited dataset and attributes defined
Li et al. (2017)	Data Mining + CNN + Multi-Modal	Fashion Outfit Scoring + Composition	Category, Image, Title	"automatic composition system"	- data-driven approach to train model by aggregating consumer feedback

	Deep Learning + RNN	(e.g. on fashion social platforms)			on fashion outfits from trafficked websites
Tabatabaei Anaraki (2017)	IGA	Fashion Design Aid System (for non-professional / customer use)	Body, Shape, Color, Outfit (Upper and Lower parts)	"interacts with users and incorporates [their] emotion and preference" and can "help enhance creativity"	- output designs reflect geometric/ architectural/ hard forms rather than soft/fluid garments (since they are generated within Rhino3D program which is a software most often used by architects) - targeted to non-professionals / customers, to enhance creativity - different from GA, IGA "interactive" function incorporates subjective emotion and preference of the user - outputs "best solutions" as opposed to improve "single design"
Cui et al. (2018)	GAN	2D Virtual Garment Visualization (in fashion industry's design & production processes, to benefit designers and customers)	Fashion Item Sketch (contour), Fabric Image (pattern/textur e)	"only needs users input a desired fabric image and a fashion sketch, a garment image based on input data will be automatically generated."	- proposed "FashionGAN" function: mapping fabric image onto a fashion item contour, to result in realistically rendered fashion image. - FashionGAN able to map stripes, but not irregular texture/patterns e.g. floral, gingham - simplified interaction, without need for time consuming, domain-specific user knowledge / experience i.e. user friendly for non-professionals - meant to be seamlessly integrated into fashion industry's design & production processes, to benefit efficiency and reduce physical samples - fabric pattern dataset cropped from garment dataset which may lack nuanced textile detail - works for single-color and regular (like stripe) fabric pattern, but unable to map an irregular one - compare different GAN architectures: pix2pix, BicycleGAN, MUNIT, CycleGAN, TextureGAN.
Karmon et al. (2018)	CAD Software: Kangaroo (Rhino3D/Gr asshopper add-on) +	Computational parametric visualization tool/ interface which predicts knitted fabric	Knitted fabric structure	"a digital / computational/ visualization / compensation tool" to "assist and ease communication", "a general design	- computational tool to support design (by way of visualization / machine code compiling) but currently does not generate creative output, but future potential to become "a generator for creating new knitted

	Python programming language + Stoll machine program	behavior (non-expert friendly), to support the digital design & industrial manufacture of custom knitted fabrics		environment for design-to-production of knits that is not dependent on computational knitting experts"	patterns" that are "derived from real user-based data" - aims to enable to simulate the physical behavior of the knitted fabric in resting condition - focus on effects of knitting structure in terms of fit & performance over aesthetic/ creativity
Sbai et al. (2018), Kemeny (2018)	GAN (StyleGAN)	AI fashion design generator (serve as creative/inspirational assistant to fashion designers in creative process)	Images of Fashion Items by Shape (based on 7 clothing categories, 7 handbag categories) & Texture (based on 7 texture categories)	"amplify creativity" & "accelerate that process" & "inspire human designers" as an "inspirational assistant"	- proposed StyleGAN architecture benefits: emphasis on creativity by setting higher creativity loss to deviate from training data, disassociating texture (style noise) and shape (mask) by applying additional loss on generator to enable shape control while allowing more creative flexibility to the inside texture - only addresses fashion image attributes of shape & texture (referring to pattern/print) – so resulting generated images lack technical detail - evaluated creativity based on an score accounting for optimum balance of "novelty" and "likability" (Wundt curve) and "realism", using quantitative metrics (nearest neighbor metric for novelty) and qualitative human survey scores (for likability). - (although novelty based on quantitative nearest neighbor metric, not qualitative human survey, which may differ from what a human considers novel) - qualitative survey revealed 61% of images generated by authors proposed method (StyleGAN) passed as design by human, and scored highest in novelty and likability - subjects of human survey not defined (i.e. if professionals or random) - p-value of human survey verifies statistical significance but

					questionable if it can account for the breadth of deviation in the image generations of subjective matter
Schwab (2018), AIArtists.org (2019)	GAN (Pix2PixHD based on conditional GAN)	AI fashion silhouette generator	Silhouette, Color, Outfit, Pattern	"outfits aren't quite ready to be fabricated [but] Barrat thinks that designers could potentially use a tool like this to find inspiration. Because it's not constrained by human taste, style, and history, the AI comes up with designs that may never occur to a person	- resulting designs lack detail, realism and "contextual awareness" of clothing functions (e.g. "missing limbs", no regard for "symmetry"), therefore making them unsuitable to be used directly for production unless interpreted. - but could leverage this as extreme creativity, thus a source of inspiration for designers
Xiao et al. (2018)	CNN	Knitted fabric structure recognition method	Knitted fabric Structure / Stitch	"automatic method for recognizing knitted fabric structures to improve productivity"	- although data-set consists of 13,600 images, they were taken from different locations of 400 pieces of fabric, so training on less variety - only 8 basic types of knit structure included in training set, no novelty, therefore the range of knit fabrics that can be recognized would be limited.
Hsiao et al. (2019)	cGAN (Conditional GAN) + VAE (Variationa VAutoencod Au)	Minimal fashion outfit adjustments recommendation tool, for consumers and designers	Shape (Fit / Silhouette) + Texture (Style / Theme / Color / Pattern / Material)	recommend outfit edits for consumers or "inspire new garment creations" for designers	- based on survey evaluating performance simultaneously by fashionability improvement and amount of change., Fashion++ able to make edits that are slight yet improve fashionability. - trained on images of outfits worn by people on street vs. editorial modeled catalog shots – thus learning the "organic" nature of how outfits are styled in real life.
Kato et al. (2019)	P-GAN (Progressive Growing of GANs) (Karras, Aila, et al., 2018)	Fashion design image generation (for sampling / production reference)	Fashion design "sketch"	"In the designing step, GANs generated design images instead of human designers… In the patterning step…human pattern makers had to imagine 3D shapes of clothing from 2D design images."	- the generated images, even if lower resolution, were sufficient to be interpreted for sampling / production as long as patternmaker had sufficient experience, i.e. more important to have skilled / trained technicians interpreting sketches than it is about quality of generated fashion design image. Which means that the sketch in this case is not playing a very important role in terms of conveying details – it is just

					giving general indicators, and patternmaker has creative liberty to interpret. Also there is no "designer" to confirm whether the design was interpreted successfully or not… - - practice led integration into design process assessment - description of the "whole process of clothing production" is simply reduced to "three steps: designing, patterning, and making", with no indication of the iterative nature of the process. - the conclusion that "result clothing were not easily distinguished from the original (human-designed) clothing, which concludes the originality of the designer was effectively reproduced" is not sufficiently proven
Liu et al. (2019)	"Attribute-GAN" (variant of cGAN)	Fashion outfit (top & bottom) pairing recommendation	Category, Color, Pattern / Print, Fit / Silhouette / Shape / Detail	clothing generation based on semantic attributes – which were pre-designated by students	- pairing of top and bottom garments - semantic attributes consist of visual / style related descriptors
Lomov and Makarov (2019)	GAN (Pix2Pix based on conditional GAN)	Virtual try-on visualization system for fashion customer retail experience	Body pose, Top body garments (Style, Fit, Shape, Silhouette, Color, Pattern)	"generate humans in clothes with respect to different fashion preferences, color layouts and fashion style"	- image mapping generation lacks accuracy in fit needed to properly inform fit decisions, thus more suited for general idea of style
Yildirim et al. (2019)	StyleGAN (unconditional & modified version)	Virtual try-on visualization system for fashion customer retail experience	Style / Outfit (composed of max 6 fashion Articles), Color, Texture, Body pose	create realistic images of human bodies + outfit, transfer style + pose between images	
Ying and Zhengdong (2019)	CNN	Textile Pattern (graphic)* intelligent design aid tool	Textile Patterns (graphic)*	"intelligent aided design system" providing "strange, unique" results providing	- function as a design aid tool to facilitate / divert more time to creative work, however designer required to set design parameters and scheme, according to needs of

				"inexhaustible source of creation", enables "human-computer interaction"	customers/ trends of year, and CNN parameters (output picture size, iterations, initialization pictures, content weight, style weight, TV weight, learning rate) – although this sounds empowering to designers allowing them to control design, may also be too many / too technical / too time consuming for designer to tune, furthermore doesn't relieve them of non creative task of researching customer needs / trends. - *"textile pattern" here basically means graphic pattern as no technical fabric data is incorporated
Wu et al. (2020)	GAN + CNN (style transfer)	Clothing style design generator with Dunhuang-inspired pattern elements	Style, Pattern	"innovative framework for "designing" new patterns and styles of clothes"	- while their model scored highest compared to other previous models, for "human preference", it is not clear what aspects of the generated images the preference was based on. - styles generated are limited / simplistic / lack detail (e.g. simple t-shirts) - the effect of the Dunhuang art style transfer lacks quality / realism – as it resembles simple wrapping of graphic image onto the clothing surface, without bringing out a sense of the fabric texture or garment details
Yuan and Moghaddam (2020)	DA-GAN (Design Attribute GAN – variant of AttGAN)	Fashion design attribute editing function	Clothing type, Sleeve Length, Color, Pattern	"automated generation of fashion product images with the desired visual attributes.", "design automation", "co-creation with AI"	- attribute-aware image generation
Chen et al. (2021)	GAN	Pattern design tool (applied to traditional costume)	Pattern (graphic)	"digitally intelligent design method", "innovative design system… that optimizes the design"	- essentially a graphic / pattern design tool as GAN applied to patterns only, and only applied to fashion items after generated.
Särmäkari and Vänskä (2021)	GAN + CLO + CAD	Generative clothing design + AI-aided digital	Garment sketch, Fashion design & production process	"Algorithmic fashion design entails hominisation of computers and computerisation of humans.", the	- qualitative case study strategy - provide empirical knowledge

		fashion sketching		designer becomes a conductor, ‘orchestrating the decision-making process of the computer’”, “teaches the machine to design…the designer transparently sets the parameters”, “autonomous, entirely automated and ‘posthuman’ process, requiring no human involvement.”, translating creative instinct to algorithmic form , “algorithmic design can augment human creativity and problem-solving capacity”, designer role as “curator, “technology is a companion, a prosthesis, a material and a medium.”	
Xu et al. (2021)	Neural Network IGA	Clothing modeling optimization (analyzing intangible cultural heritage elements in clothing design)	Cultural Heritage Image Attributes (Color, Decoration, Material, Structure) + Fashion Design Elements (Modelling, Color, Pattern, Material)	“interactive evolutionary computation combines genetic algorithm with human subjective evaluation”	

Yang et al. (2021)	CNN + cGAN (Conditional GAN) / DCGAN	"Emotionally intelligent"* product image recognition + design generation	Footwear (Shape, Gender, Style)	"integrating consumer emotional needs into the practical product design", "designer or the user only needs to define the product image to automatically acquire a number of satisfactory product designs", provide design inspiration to expand creativity	- *in actuality the emotionally intelligent simply refers to the detection of style / aesthetic attributes - "solve cognitive difference between designers and consumers in emotional product design" - only 4 categories of image labels (style descriptors) for image recognition (Male/Female; Modern/Retro; Casual/Formal; Gorgeous/Plain) - image recognition model still reliant on manual labelling (supervised learning) of images for training.
Yan et al. (2022)	StyleGAN2 (Karras et al., 2020) + PatchGAN (Isola et al., 2017) + LSGAN (Mao et al., 2019) (variations of)	AI fashion design generator (of sketch + rendering)	Sketch (Category, Shape) + Texture (Color, Drape, Pattern)	"able to assist designers to automatically accomplish the fashion design process", "assist designers to automatically create certain preliminary context-sensitive fashion designs according to users' requirements"	- inaccurate portrayal of the fashion design process by saying "Normally, the first step of a fashion design for designers is to create a sketch. Subsequently, they select appropriate textures according to the occasion or season to finally develop a clothing item or outfit." - Only 7 fashion-related categories designated: skirts, jeans, tops, backpacks, hats, shorts, and jackets able to perform conditional style transfer of colors from given inspiration image

2.5.3 Empirical studies of Deep Learning driven Computational Creativity for Creative Design in Fashion

The growing number of applications of deep learning driven computational creativity towards creative fashion design tasks, as introduced in the previous section, has only motivated a limited number of empirical studies examining the impact of such applications in a real-world context, as it remains a relatively nascent technology. Whereas there exists a great deal more examples of empirical studies that examine applications of computational intelligence for the fashion creative design process in the form of CAD, PLM, or 3D virtual sampling software. For example, notable studies, such as that by Segonds et al. (2015), have outlined the functionalities of PDM tools and evaluated their potential to facilitate various aspects of the fashion design process, while select studies have culminated specifically towards how CAD tools could potentially help streamline information exchange between creative designers and technical designers in the knitwear design process (Eckert, 2001; Eckert et al., 2000), or another direction taken by Petre et al. (2006) applies computational modelling to mimic and therefore understand the creative design thought process by which design inspiration is incorporated into knitwear designs. Studies which fall into the latter category mentioned, have evaluated the value of GAN-based designs based on consumer receptiveness to fashion products designed with GAN (Sohn et al., 2020), or to fashion products powered by deep learning (Liang et al., 2020).

These studies adopt a range of different theoretical models to evaluate the effectiveness of the respective computational tools or products involved. For example, Liang et al. (2020) adopt the Technology Acceptance Model (Davis, 1989), Sohn et al. (2020) adopt the Consumption Value Theory (Vinson et al., 1977) and Segonds et al. (2015) adopt the Case Study Methodology for Business Research (Dul, 2008). Thus these studies ground their observations and evaluation on established theoretical footings. Some noteworthy empirical observations on the impact of computational tools towards the fashion design process that the aforementioned studies collectively align on include:

- computational support in the form of CAD and PDM / PLM tools in general have shown practical utility in aiding cross-functional collaboration and information exchange, and help manage workflow, however they have comparatively had less presence in the early stages of the creative fashion design process, as shown by Segonds et al. (2015) side-by-side comparison of PDM systems where only two out of the nine rated cater to the textile design stage. One reason deterring it is that the spatial and kinetic characteristics of textiles are especially difficult to manifest in a digital format.
- Studies which do address the application of CAD towards the early design stages mainly concern the parametric design of garment pattern blocks in relation to overall shaping and fit. The reason CAD can particularly benefit that area is because of dimensional variation in pattern blocks between one design and another is relatively small, therefore it is a great deal more efficient to work from existing pattern blocks (from a previously developed design for example) and just make minor alterations instead of creating them from scratch. Thus digitizing pattern blocks in a CAD system facilitates a more efficient and accurate pattern making process within the fashion design process.
- The application of CAD tools in the fashion design process in general has helped reduce time, cost, material usage, and improve accuracy, and ultimately garment quality. This is attributed to many reasons, such as enabling the digital visualization (now widely possible in 3-dimensional form) of a design before pulling the trigger on physical sampling or production.

Also the digitization of design information in general makes it more convenient to track, exchange across organizations or borders, replicate or adjust from as needed.

- One potential barrier to the acceptance of computational creativity in the fashion creative design process could be what is referred to as “algorithm aversion” – which can manifest as an aversion to the idea of artificial intelligence as its mechanical nature can seem incongruent with the instinct driven nature of creative design processes (Sohn et al., 2020).
- There is an overall positive acceptance towards artificial intelligent driven fashion product from a consumer standpoint at least (Liang et al., 2020; Sohn et al., 2020).

Given the limited number of empirical studies evaluating the contributions of deep learning based computational creativity in the fashion industry’s creative design process, this section referred more heavily to empirical studies on the contributions of the more established forms of computational design support tools, such as CAD, PLM, or 3D virtual sampling software. Doing so was nonetheless informative on the ways in which computational intelligence in general has facilitated and shaped the fashion creative design process, in terms of improving workflow efficiency and acclimating it towards the digitization of formerly material assets. Therefore in the same vein, deep learning based computational creativity also has potential to offer the benefits of workflow efficiency and digitization, but what sets it apart is its potential to innovate fashion’s creative design process by offering to be more than just an assistive tool to designers but perform creative tasks self-sufficiently as a designer essentially. However, more thorough empirical studies on practical real-world industry value of this distinct potential of deep learning driven computational creativity are needed.

2.6 Conclusion

The observations made in this review has pointed towards the following limitations & opportunities in existing studies or initiatives of deep learning driven computational creativity for the fashion industry’s creative design process:

- Lack of attention towards the textile: across the existing applications of deep-learning driven computational creativity which support or perform the creation of fashion creative design product, there is an greater emphasis on the superficial graphical elements (e.g. style, silhouette, colour, graphical pattern or print), and a subsequent lack in addressing the characteristics of the underlying textile material, which in reality plays an instrumental role in defining the fashion end-product, both aesthetically and functionally. Whether this is a symptom of distorted assumptions of the fashion creative design process which underrates the role of the textile, or of the still developing status of deep learning in handling content beyond 2-dimensional images that includes the spatial and mechanical features of textiles (Luce, 2019), regardless it implies an opportunity for deep learning based computational creativity to have a greater usefulness in the fashion design process and product by addressing the underlying textile traits. Similarly put by Yuan and Moghaddam (2020), that "current literature merely focuses on the generative design of ''form'', disregarding other non-visual aspects associated with its ''function'' (e.g., architecture, materials, performance). Second, there is a lack of a standardized method of assessing the performance of the generated design concepts [69]. Few recent studies propose assessment mechanisms based on form-function relationships [68] (e.g., physics-based simulators); however, those mechanisms are domain-specific and applicable to a limited set of functional attributes (e.g., aerodynamic performance). Future research must build novel, verifiable GAN-based generative design techniques capable of conditioning the design concepts on both visual and functional attributes."

- Lack empirical understanding of fashion's creative design process & product: just as the applications of deep learning driven computational creativity have been lacking in addressing the real-world issues of the fashion industry's creative design process, there has been a lack of empirical studies examining the effectiveness of deep learning driven computational creativity applications in a real-world creative fashion design context (Sohn et al., 2020). Most of the existing studies concerning the application of artificial intelligence in the fashion design process show an oversimplified understanding of the process which does not sufficiently acknowledge that the creative conception of a design always begins with the elemental features such as yarn and fabric. This is important as without properly understanding the fashion design process, then we cannot create computational systems that adequately and realistically cater to them. Emily Spratt also alluded to this concern, stating that "some computer scientist researching in this area [of arts], who do not collaborate with scholars from the arts have tended to investigate the foundations of fields in the humanities as terra incognita, which is an approach that art and music historians don't find helpful", instead "what is needed is integration of the tools from computer science in to the pre-existing methodological frameworks used in the carious fields in the arts rather than a pedagogical category that has unintended effect of fostering the sequestration of this area of research" (Spratt, 2018a). Furthermore, most ventures remain experimental in part due to the underdeveloped nature of the interfaces towards creativity but also the misleading concept of artificial intelligence to replace human designers.

Instead the focus should be on facilitating over automating the creative task of designing. Moreover, the limited empirical studies which do evaluate deep learning based computational creativity applications in fashion are based on the perspective of the consumer or end-user of the creative design product, as opposed to perspective of the creators or designers of the creative design process. Thus there is opportunity for empirical evaluations of the impacts of deep learning based computational creativity on creative design process, similar to the approach taken by Zhang et al. (2021), but instead focused specifically on the specialized fashion creative design process. Furthermore, whether applications or empirical enquiries, in order to have practical outcomes, it is important they are based on a robust contextual and empirical understanding of the creative design process realities. This priority is well voiced by Bown (2012) in: “It is hard to make informed decisions about the relative virtues of different computational methods (genetic algorithms, neural networks, etc.) because arts-based computational creativity research lives mainly in the lab, with many additional steps required to get from this to the real field of human artistic activity. This suggests the need for a richer characterisation of creativity, including the role of social dynamics as a creative system, as well as the role of creative individuals within that system.” In a similar vein, Eckert (2001) also justifies taking a knowledge level ethnographic approach to properly understand a knitwear design process prior to implementing tools, as it provides “rich insight into social behaviour, organisational processes and culture in the companies observed”. Several studies share this view (DiPaola & Gabora, 2009; Gabora & Aerts, 2005; Sohn et al., 2020; Spratt, 2018a), that only with proper contextual and empirical understanding of the relevant creative design processes is there a grounded basis for AI developments with practical applicability. The term “relevant” used is also important as it emphasizes the importance of focusing on the creative design processes from the perspective of (a) its specialized nuances (e.g. as the nuances of the knitwear category in fashion), (b) its current and not out-dated state (e.g. given the fast-changing nature of certain industries such as fashion), and (c) its relevant key players (e.g. involving experienced industry experts). For example, even though the seminal studies of Eckert et al. (Eckert, 2001; Eckert et al., 2000) provide a “relevant” overview of the knitwear design process in terms of comprehensively capturing the nuances of knitwear, and in terms of involving key participants in its creative design process, yet it was conducted over 20 years ago now during which the processes and product of the fashion industry have inevitably evolved drastically, automatically rendering it obsolete in some ways. Thus considering how fast certain creative design processes have evolved over the recent years, due to new technologies that have benefitted organizational efficiencies (e.g. new 3D CAD technologies or new forms information exchange), and as a result of global scale disruptions – such as increased labour costs, international trade wars, sustainability objectives, internet and mobile device expansion, growing app and social media usage, and COVID-19 – warrants updated studies that are relevant to its current state. Hence, there is a great deal of opportunity for studies on deep learning based computational creativity in creative fashion design that more aptly address its practical demands and by tackling this opportunity will ultimately help future developments produce greater real-world utility and relevance.

- Lack theoretical basis of fashion's creative design process & product: another limitation manifest in existing examples of deep learning based computational creativity in the fashion creative design process is need to incorporate established foundational creative design theories to help shape work in the area – something which is emphasized and more widely exemplified in other creative design fields (Lamb et al., 2018), but less so in the fashion field. By basing applications of computational creativity on established creative design theories can enable it to better cater to practical needs even for more specialized areas. One example of why foundational creative design theories can still benefit a specialized creative design function is because they can introduce new patterns that may not have been apparent by just focusing within a specialization, but could help innovate it regardless. For example, Jones et al. (2012) models the various patterns of interfacing between an "artist", "canvas" and "computational system", which suggests that computational creativity could provide support to creative tasks at varied degrees of autonomy and that the goal isn't simply to automate creative design (a concept which tends to deter creatives). This broader view of computational creativity's potential encourages more acceptance and opens more possibilities.
- Lack of assessing by actual professional users of the practical viability of the generated designs. as put by Yuan and Moghaddam (2020), that "there is a lack of a standardized method of assessing the performance of the generated design concepts [69]."

To summarize, this study postulates that existing work in deep learning driven computational creativity collectively manifests a lack of practical applicability towards the fashion creative design process & product, a gap which future studies can potentially address by (a) assimilating the integral textile attributes, (b) adopting an empirical approach to gain a realistic and relevant understanding of nuances within a specialized creative design process & product category, and (c) relating to foundational creative design theories.

Overall this review has provided background context into deep learning driven computational creativity and the nature of the fashion industry's creative design process and product, and culminated in reviewing examples of deep learning driven computational creativity applied to the creative design process of the fashion industry. As a result, this review has yielded several key takeaways on potential gaps and opportunities for future research to address. Namely, this review has shown a growing momentum in various creative applications of deep learning driven computational creativity, and a widespread acknowledgment of its potential to enhance and exhibit creativity. Attempts to leverage this creative potential in the fashion industry's creative design process remain predominantly experimental and unconventional, and generally manifest a lack in practical applicability to real-world needs, which we suggest could be addressed by expanding beyond the basic garment features to incorporate deeper elements such as textile properties and by investing more research towards strengthening empirical and theoretical understanding of the creative potential that deep learning driven computational creativity has to offer creative design in fashion. For now, its potentials are promising, especially as a creative collaborator, considering how support from more established forms of computational intelligence, such as CAD, PLM, 3D virtual sampling software, have already exhibited the streamlining benefits of digitalization in the fashion creative design process. Perhaps with the novel potentials of deep learning based computational creativity to not just assist creativity but even exhibit creativity itself could elevate creativity in fashion to new heights.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter presents the methodologies of this study's objectives, which are summarized in Table 3. This study consists of objectives which each contribute cumulatively towards a conclusive holistic "story", thus warranting the adoption of a distinct methodology for each research objective. This chapter will outline the theoretical framework that justifies the designed methodological approach, and then consecutively describe the research methodologies & methods for each research objective, as well as the strategies to uphold data validity. As the first research objective is addressed via the Literature Review, in this chapter it is considered the "exploratory" objective, whereas the second and third research objectives will be differentiated as the "empirical research objectives", as they are the ones which required empirical evidence.

Table 3: Respective Methodology/Methods of the Research Objectives summary

Research Objective	Methodology	Method (procedure/tools/sources)
1) Explore systematically the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process.	Thematic Literature Review	**Academic sources**: e.g. journal publications, conferences **Industry sources**: e.g. news articles, reports, exhibitions
2) Devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.	Practice-Led	**Digital tools**: Python, Clo3D, Runway ML, Excel, Stoll M1Plus **Physical tools**: Stoll knitting machine, hand knitting loom
3) Evaluate empirically the creative value and practical utility of the devised computational method.	Mixed Method	**Survey**: General Public via online forms platform survey **Interviews**: Fashion industry experts (with real – world experience) through questions / conversation via video conferencing platform

3.2 Theoretical Framework behind Research Methodological Approach & Justifications

According to the Literature Review chapter, discovering the collective strengths and limitations in the methodologies of past studies helped shape the design of this research study:

- the lack of empirical understanding of the fashion industry's creative design process & product shaped the thematic literature review methodology to cover this theme and influenced the interview of fashion professionals for the qualitative evaluation of the outcomes of the computational method.
- the majority of existing studies having been conducted from a computer science methodological perspective, and few done from a design practice perspective.
- the definition of computational creativity as expressed by M. Boden (2009) influenced the method of evaluation adopted in the survey of the computational method

The following sections will consecutively describe the methods adopted for each objective of this study.

3.3 Research Method for Objective 1

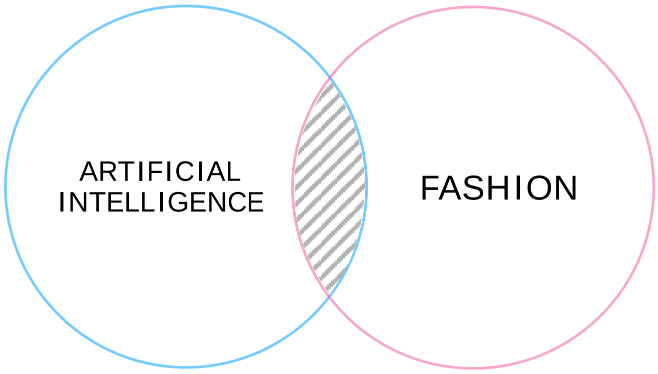
Research Objective 1 concerns systematically exploring the research and methods surrounding the focal topic of this study, deep learning driven computational creativity for knitted textile design in the fashion creative design process. To be clear however, arriving at this objective first required a preliminary expanded literature review search, from which the results helped to inform and establish this study's focal topic. Therefore, the entire literature review process comprised of (1) an initial preliminary systematic literature search which narrowed in on focal topic area, followed by (2) a thematic literature review of the topic's constituent themes.

The following subsections will explain and justify the methods within each of these two stages of the literature review process.

3.3.1 Literature Review Systematic Search Strategy

Prior to establishing the study's focal topic, an initial preliminary systematic literature review search was conducted based on the scope of Artificial Intelligence in the Fashion Industry, or more fundamentally speaking, based on the intersection between the themes "Artificial Intelligence" and "Fashion" (represented in Figure 16).

Figure 16: Intersection between themes "Artificial Intelligence" and "Fashion", representing search scope of preliminary literature review search



The literature search included scholarly sources as well as popular (non-scholarly) sources, obtained through separate methods as detailed in the enclosed sections.

3.3.1.1 Scholarly Literature Search

To conduct the search of scholarly literature, the database Scopus (scopus.com) was used. Scopus, a registered trademark of Elsevier B.V., is an abstract and citation database of peer-reviewed literature and was used over other databases because of the size and multidisciplinary scope of its literature coverage, as well as its practical search results analytics features.

Two main search queries were conducted using Scopus, on April 21, 2020. The first search query cast a wider net to capture the amount of scholarly literature published on Artificial Intelligence in general (i.e. within various fields of study or industries), so as to gauge context and a point of comparison before honing in on literature specific to Fashion. In terms of search query, this was translated to the following search terms & criteria:

(KEY(artificial intelligence OR ai OR a.i. OR intelligent))

This search query yielded a total of 31,2983 results, which were then broken down by Year Published (spanning from 1951 to 2019), using the Scopus "Analyze Search Results" function, and exported into Excel, from which the graph in Figure 14 was derived.

The second search query subsequently narrowed in on scholarly literature published on Artificial Intelligence specific to the Fashion field (interpreted as encompassing Textiles and Apparel). In terms of search query, this was translated to the following search terms & criteria:

((KEY(artificial intelligence OR ai OR a.i. OR intelligent)

AND KEY(fashion OR apparel OR garment OR clothing OR textile)))

The "Fashion field" theme was represented via an expanded set of keyword criteria, which included "fashion", "apparel", "garment", "clothing" and "textile". The reason for this expanded keyword criteria was to capture relevant literature that might be overlooked, given the concern that the keyword "fashion" may be too general, and the nature of academic literature to adopt more specific, technical, fundamental terminology.

This search query yielded a total of 535 results, which were then broken down by Year Published (spanning from 1986 to 2019), using the Scopus "Analyze Search Results" function, and exported into Excel, from which the graphs in Figure 13 and Figure 14 were derived.

The 535 search results of scholarly literature on Artificial Intelligence specific to the Fashion field were then analyzed more deeply and categorized based on what stage of the fashion value chain process the studies were respectively focused on. The respective categories of the fashion value chain process which they were sorted into are as follows:

- CREATIVE DESIGN
- TREND FORECASTING
- TECHNICAL DESIGN / FIT / PATTERN-MAKING
- SALES FORECASTING
- RETAIL / MARKETING EXPERIENCE / CUSTOMER ENGAGEMENT
- ATTRIBUTE RECOGNITION / CLASSIFICATION / RECOMMENDATION
- TECHNICAL QUALITY / DEFECT DETECTION
- PRODUCTION / MANUFACTURING / SUPPLY CHAIN
- GENERAL REVIEW
- SMART WEARABLES
- EXTRANEOUS

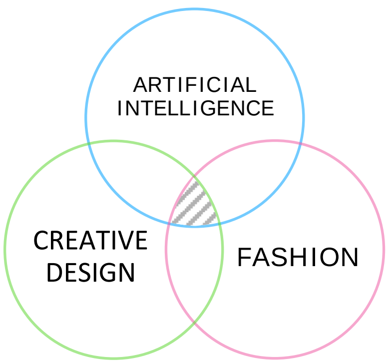
The literature which ended up categorized into "GENERAL REVIEW", "SMART WEARABLES" and "EXTRANEOUS", a total of 214 results, were omitted from the subsequent analysis. The respective reasons being:

- literature sorted under "GENERAL REVIEW" pertain to multiple stages of the fashion value chain
- literature sorted under "SMART WEARABLES" consider smart wearables as artificial intelligence, however this study is referring to the artificial intelligence pertaining to machine learning, deep learning etc., which although is sometimes used in smart wearables, is a separate technology
- literature sorted under "EXTRANEOUS" were found to be not related to the Fashion field as it is being considered in this study (and they were caught in the search results erroneously e.g. because they used the word "fashion" as a verb instead of a noun)

After this data cleaning process, the remainder 321 literature search results were then charted according to their assigned categories into Figure 15 (via Excel), which conveyed the distribution of scholarly literature on Artificial Intelligence specific to the Fashion field (publication dates spanning 1986 to 2019), in terms of the stage of the fashion value chain process they focus on.

After this analysis process, as described in the Literature Review chapter, it was deduced that there was a relative limitation in studies on Artificial Intelligence pertaining to the creative design stages of the fashion value chain – and consequently it was decided as the focal topic of this study. Therefore to proceed, a new, more focused search was conducted, to capture scholarly literature reflecting the intersection between "Artificial Intelligence", "Fashion" (expressed as encompassing Textiles and Apparel) and "Creative Design" (as represented in Figure 17).

Figure 17: Intersection between themes "Artificial Intelligence", "Fashion" and "Creative Design", representing focused search scope of subsequent literature review search



This search query, also using Scopus, was translated to the following search terms & criteria:

((KEY(artificial intelligence OR ai OR a.i. OR intelligent)

AND KEY(fashion OR apparel OR garment OR clothing OR textile)

AND KEY(creative OR design)))

This search was not only conducted once, but periodically throughout the duration of the study (from 2018 to 2021), in an effort to keep up to date with the developments in the respective topic area. All literature search results were screened & filtered for relevance based on the criteria such as:

- "Artificial Intelligence" manifest as machine learning, deep learning, or computational creativity.
- the "Creative Design" process in the "Fashion" field manifest as applicable specifically to creative idea generation / concepting stage (and not, for example, the more technical functions which can sometimes also be considered a part of the overall design process, such as material R&D, patternmaking, fitting, garment engineering).
- the way the "Artificial Intelligence" is adopted or applied in the "Creative Design" process of the "Fashion" field can vary i.e. from being directly involved as a design generator, to being indirectly involved as a faciliatory tool. So for example, literature pertaining to using artificial intelligence for a fashion recommendation tool, although typically suggests a retail end-use, also has potential to facilitate the creative design process as an inspiration tool, thus considered relevant to this study's focal topic.

Based on the above filtering process, this narrower search query yielded an eventual 29 literature results which are listed and reviewed in Chapter Section 2.5.2.1 Literature Review Matrix.

3.3.1.1.1 Limitations

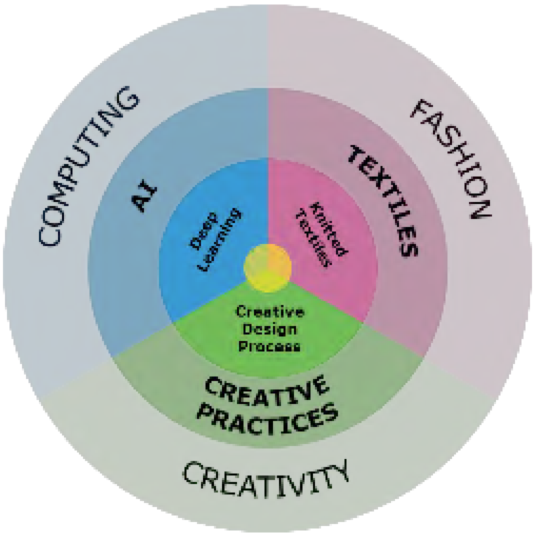
As the literature review searches described in the previous section were conducted using Scopus, the resulting literature was scholarly in nature. This presented a limitation in that a great deal of notable developments related to the intersection of Artificial Intelligence, Fashion and Creative Design potentially take place outside the academic domain, and therefore might be overlooked by solely relying on Scopus as a search strategy. Therefore, a different literature search strategy was adopted to be able to include popular (non-scholarly) sources in the literature review, to help ensure a more comprehensive and balanced perspective.

3.3.2 Thematic Literature Review Strategy

Because this study's topic involves the intersection of 3 distinct themes, "Artificial Intelligence", "Fashion" and "Creative Design", each of which can be considered broad fields in and of themselves, it was necessary to develop an understanding of each theme within the broader context of its field as well as in relation to each other theme. In other words, although the study's specific aim is to tackle the 3 themes in core of Figure 18, it will be done within the broader context of the respective fields indicated in the surrounding concentric layers, in order to foster interdisciplinary knowledge transfer and application in the outcomes of this study.

Hence a thematic literature review was conducted, which approached the 3 thematic segments of the study's objectives, represented in Figure 18, with a systematic organizational methodology, from "outward-in" and also "side-by-side".

Figure 18: Scope of Study topic areas portrayed visually



By "outward-in", this means the literature review will start with the broader themes in the outer tiers of Figure 18 (of Computing > AI, Fashion > Textiles, and Creativity > Creative Practices), and gradually hone in towards the key objective topics in the inner circle (of Deep Learning, Knitted Textiles and the Creative Design Process, respectively). This "outward-in" approach is to culminate in a holistic contextual understanding of the objective's key themes, and ultimately foster interdisciplinary knowledge transfer and application in the outcomes of this study (reference). By “side-by-side”, this means the literature review will approach the intersection between adjacent pairs of the 3 thematic segments. Figure 19 further conveys this thematic literature review approach, with the 3 thematic tiered segments, their respective intersections to be explored, and the Sections of the literature review they correspond to.

Figure 19: Organizational methodology of Literature Review portrayed visually

3.4 Research Method for Objective 2

Research Objective 2 aims to devise a method which applies deep learning based computational creativity to facilitate the knitted textile design in the creative fashion design process. The methodology and methods adopted to tackle Objective 2 were derived from the findings and conclusion of conducting Objective 1: an iterative practice-led methodology was adopted as the means to formulating the computational method that can be applied to facilitate the knitted textile design process; and a deep learning model was adopted as the computational method. The following sections will explain and justify these adopted methodology and methods: Section 3.4.1 will explain and justify the practice-led methodology adopted to explore ways a deep learning based computational method could be incorporated to facilitate the knitted textile design process, and Section 3.4.2 will explain and justify the computation model method adopted.

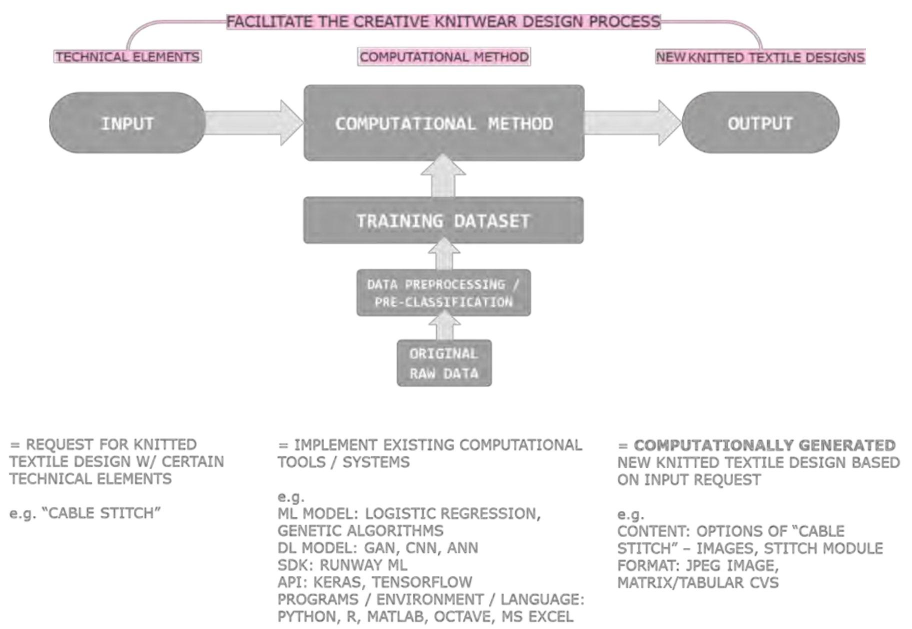
3.4.1 *Practice-led Methodology*

The process of devising the computational method of Objective 2 was in itself iterative and exploratory in nature, emulating a Practice-led research approach. In other words, the investigator themselves experimented with various computational methods as design tools to first-hand experience the implications of the process and not just the product. This focus on the process as well as the product of a creative practice is a methodological strategy which Kenning (2015) alludes to in the incorporation of digital tools in craft practices: "In refocusing attention from the object to the innovative potential of how the object is formed through systems and processes…engaging with processes of "creativity". The digital environment offers many opportunities to extend creativity by removing the focus from the physical object and refocusing attention on the pattern and the process…In this environment, innovation, and authenticity, once located within the object, now reside within the processes and experiences."

3.4.2 *Computational Model Method*

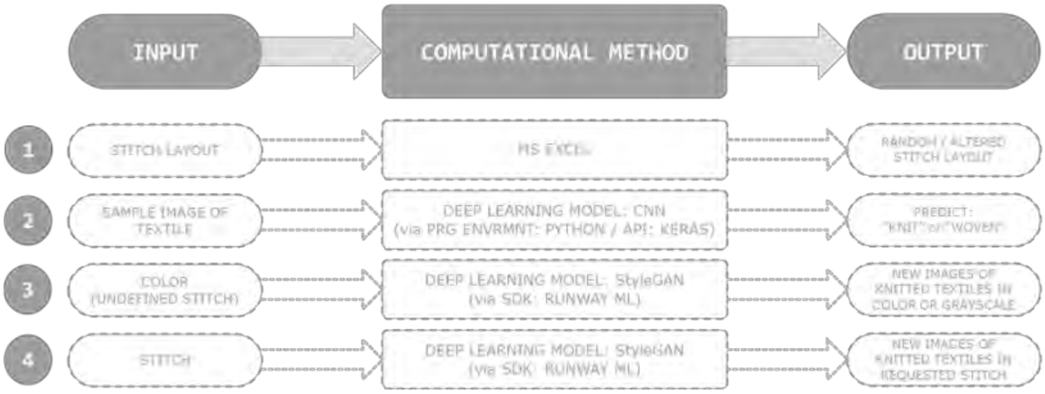
The sequence of the deep learning based computational methods adopted in the exploration towards Objective 2 can be summarized by the flowchart in Figure 20.

Figure 20: Flowchart of computational methods explored in this study



In the initial stages, a preliminary exploration of various computational methods was conducted, with a practice-led approach. Below Figure 21 visually outlines each computational method tested in this preliminary exploration:

Figure 21: Preliminary exploration of Computational Methods



These four successive variations of computational method experiments were conducted to establish the best computational method to fulfil the objective. Below Figure 22 to Figure 25 respectively show the four experiment variations outlining the details of their inputs, outputs, and processes.

Figure 22: Flowchart of computational method experiment variation 1

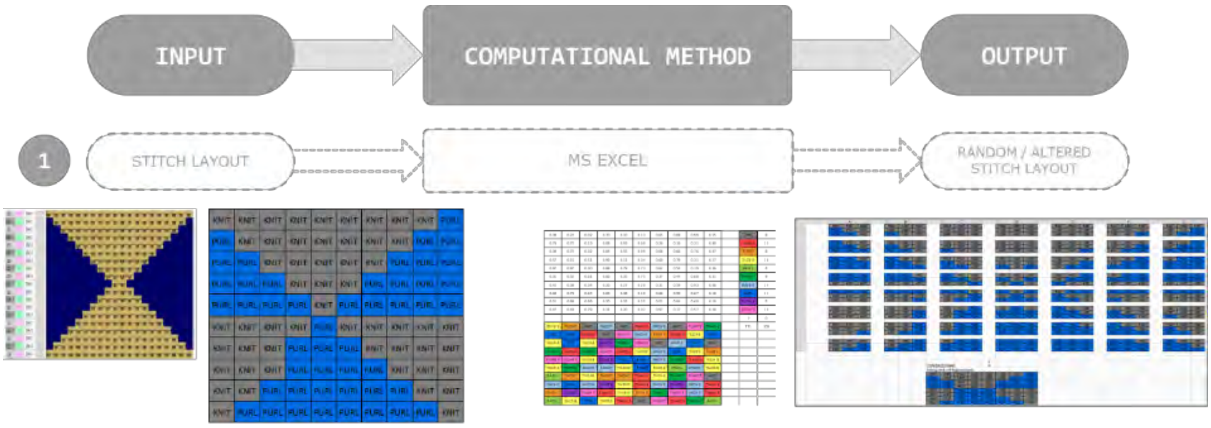


Figure 23: Flowchart of computational method experiment variation 2

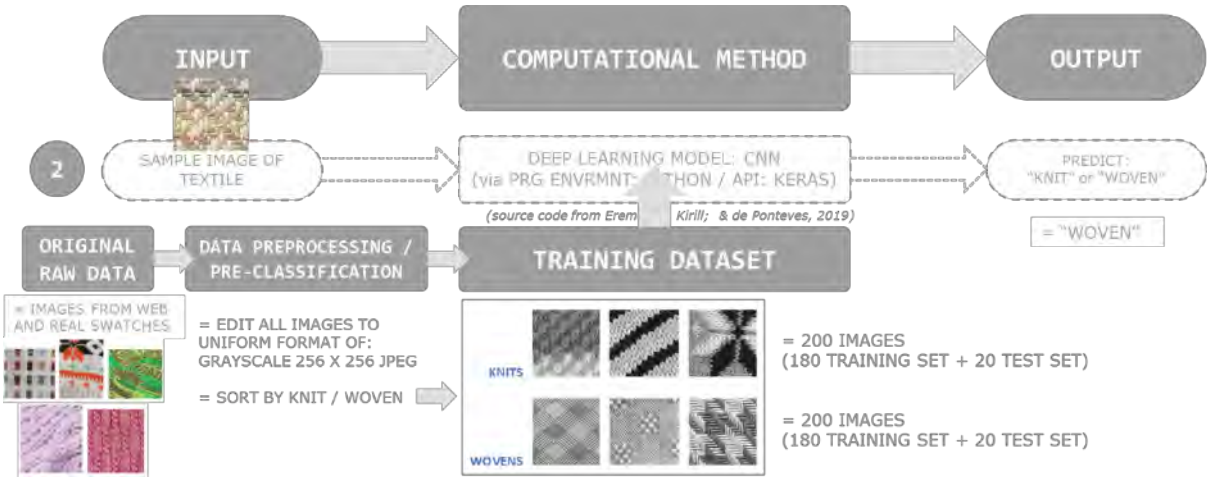


Figure 24: Flowchart of computational method experiment variation 3

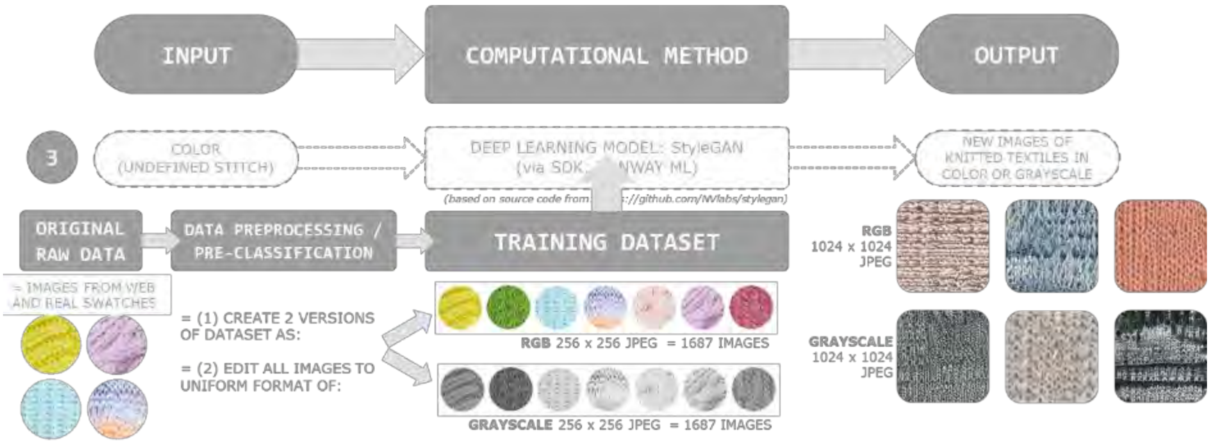
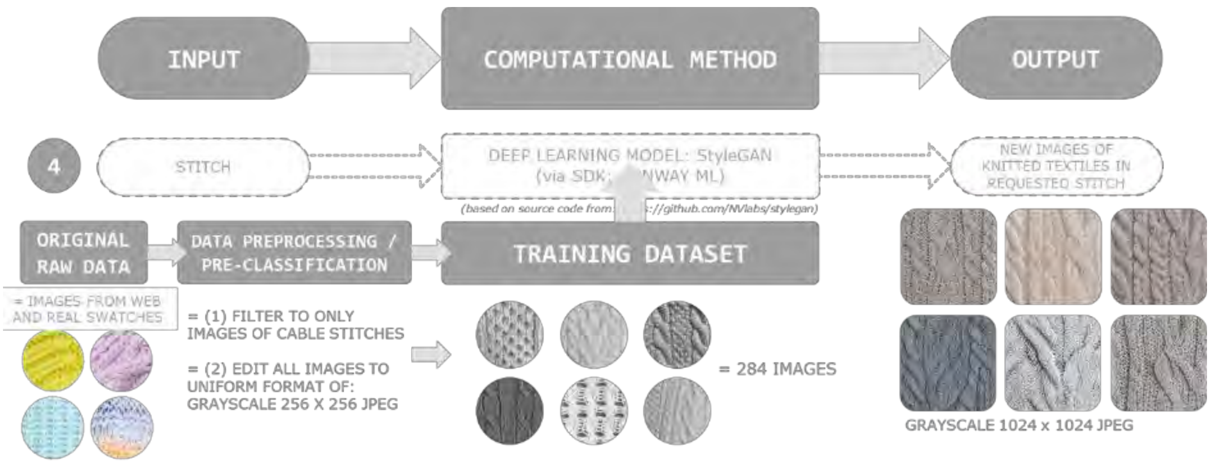


Figure 25: Flowchart of computational method experiment variation 4



The procedural details of each computational method experiment variation are as follows:

(1) **Computational method experimentation variation 1:** the purpose was to test whether a CNN could distinguish the subtle image details distinguishing knitted from woven textiles.

- Computational Model: CNN (source code adopted from (Eremenko & de Ponteves, 2019))
- Input: sample image of a knit or woven (JPEG, Grayscale, unspecified size)
- Training / Test Dataset:
    - images pre-processed to 256 x 256 Grayscale JPEG format
    - images pre-divided into 2 classes:
        - knitted textile images (180 Training set + 20 Test set)
        - woven textile images (180 Training set + 20 Test set)
- Output: classification prediction: "0" for knit or "1" for woven

(2) **Computational method experimentation variation 2:** the purpose was to test whether StyleGAN could generate new images which resemble knitted textiles, even considering this relatively small dataset size, to gauge whether it could pick up the subtle features across a diverse knitted textile image dataset. First version was done using RGB (coloured) images, and second version the same images were converted to grayscale, for the additional hypothetical intent of testing if eliminating colour from the image dataset (i.e. using 2-dimensional tensors of grayscale instead of 3-dimensional tensors of RGB) would enhance other features of the generated knitted textile images (and also benefit to be more computationally manageable to train and reduce training time).

RGB test version:

- Computational Model: StyleGAN (source code based on GitHub repository: https://github.com/NVlabs/stylegan), applied via an open-source creative machine learning platform called "RunwayML" (https://runwayml.com/).
- Input: request for a new image of a knitted textile
- Training / Test Dataset:
    - unsorted dataset of 1,687 knitted textile images total
    - images pre-processed to 256 x 256 RGB JPEG format
- Output: new generated images resembling knitted textiles (1024 x 1024 RGB JPEG format).

Grayscale test version:

- Computational Model: StyleGAN (source code based on GitHub repository: https://github.com/NVlabs/stylegan), applied via an open-source creative machine learning platform called "RunwayML" (https://runwayml.com/).
- Input: request for a new image of a knitted textile
- Training / Test Dataset:
    - unsorted dataset of 1,687 knitted textile images total
    - images pre-processed to 256 x 256 Grayscale JPEG format
- Output: new generated images resembling knitted textiles (1024 x 1024 Grayscale JPEG format).

(3) **Computational method experimentation variation 3:** the purpose was to test the effect of tailoring the training dataset to represent a specific attribute desired from the output, and thus whether StyleGAN could generate new images which resemble knitted textiles in cable stitches, and as a result of streamlining the training dataset, allow the output generates images to exhibit enhanced definition and discernment of the subtle features characteristic of the knitted textile cable stitch image data.

- Computational Model: StyleGAN (source code based on GitHub repository: https://github.com/NVlabs/stylegan), applied via an open-source creative machine learning platform called "RunwayML" (https://runwayml.com/).
- Input: request for a new image of a knitted textile in a cable stitch
- Training / Test Dataset:
    - filtered dataset of 284 images of knitted textiles with cable stitch structures
    - images pre-processed to 256 x 256 Grayscale JPEG format
- Output: new generated images resembling knitted textiles in cable stitches (1024 x 1024 Grayscale JPEG format)

(4) **Computational method experimentation variation 4:** the purpose was to generate new images of knitted textiles according to a specified knitted textile technical element (e.g. course gg, rib stitch, warm hand), to be captured in in the output.

- Computational Model: StyleGAN (source code based on GitHub repository: https://github.com/NVlabs/stylegan), applied via an open-source creative machine learning platform called "RunwayML" (https://runwayml.com/).

- Input: request for a new image of a knitted textile with specific attributes pertaining to the underlying technical elements of knitted textiles e.g. "coarse gg, dry hand, rib stitch")
- Training / Test Dataset:
    - images pre-processed to 256 x 256 RGB JPEG format
    - dataset of 2,295 knitted textile images total, pre-sorted into multiple classes according to the various knitted textile attributes
- Output: new generated images resembling knitted textiles with the specified attribute, pertaining to the technical elements of knitted textiles, based on the input request (1024 x 1024 RGB JPEG format)

3.5 Research Method for Objective 3

Research Objective 3 requires an empirical evaluation of the devised computational method, in terms of the creative value and practical utility derived from its application in the fashion creative design process. The method of this empirical evaluation manifested as a mixed method approach, involving (1) a survey to evaluate the aesthetic quality of the designs generated by the devised computational method, and (2) interviews to evaluate the practical application of the devised computational method, explained in the following Sections 3.5.1 and 3.5.2 respectively.

3.5.1 Design of Survey Questionnaire

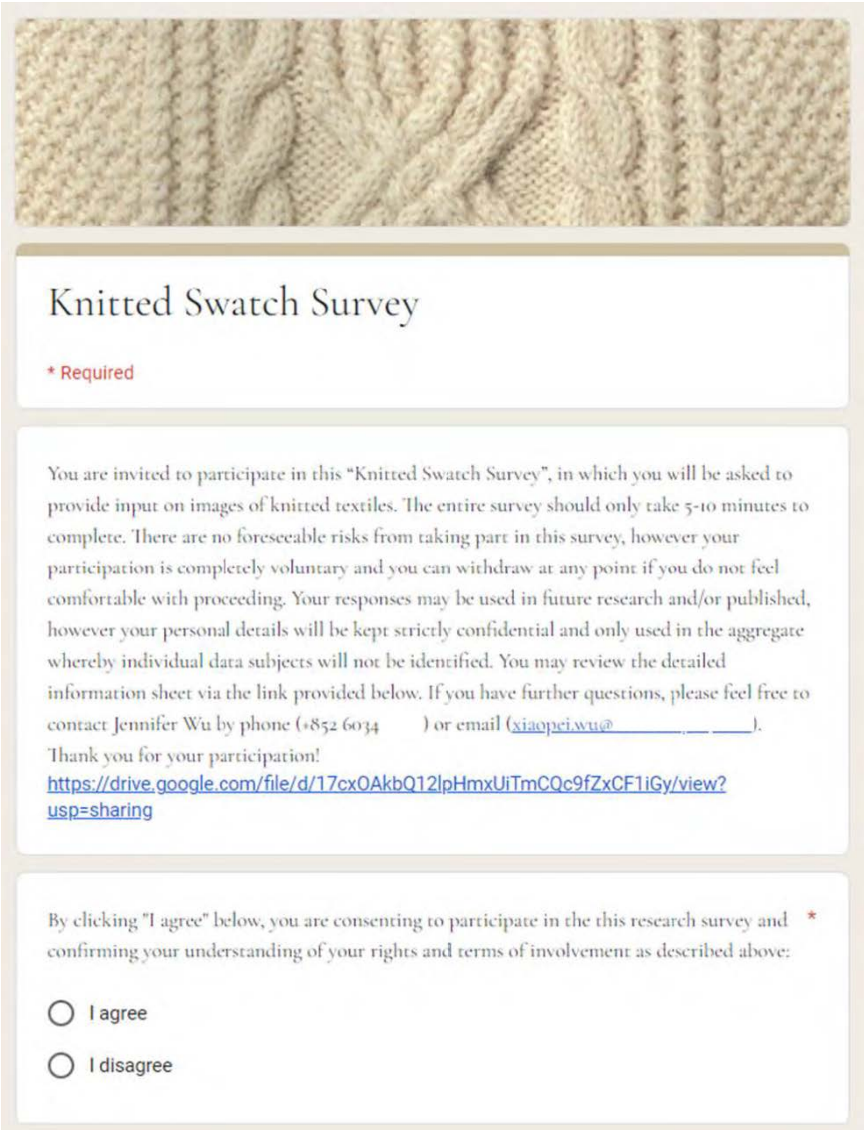
To satisfy the study's Objective 3, a survey was designed to evaluate the creative value of what was produced by the devised computational method – and the term "creative value" here refers to the qualitative, aesthetic features, such as creativity, trendiness, innovation, and style. Survey data was collected by conducting a questionnaire. The formats and procedures of this questionnaire are detailed as follows:

- Format: online form using Google Forms (URL link: https://forms.gle/6viypo5Xjfm9NuwZ)
- Participants: 211 random participants across the academic and industry networks of the Primary and Co-Investigator
- Timing: data collection took place between Nov 2020 – April 2022

- Procedure: participants were sent the URL link (via email, text, presentation slide with scannable QR code) and given the option to complete immediately or at their convenience.
- Design:

  Screenshots of the questionnaire is captured consecutively in Figure 26 to Figure 33. It begins with a page to confirm the participants consent, providing the expectations and rights, as well as a link to a more detailed information sheet for reference (Figure 26).

Figure 26: Screenshot of Questionnaire start page (consent form)



Knitted Swatch Survey

* Required

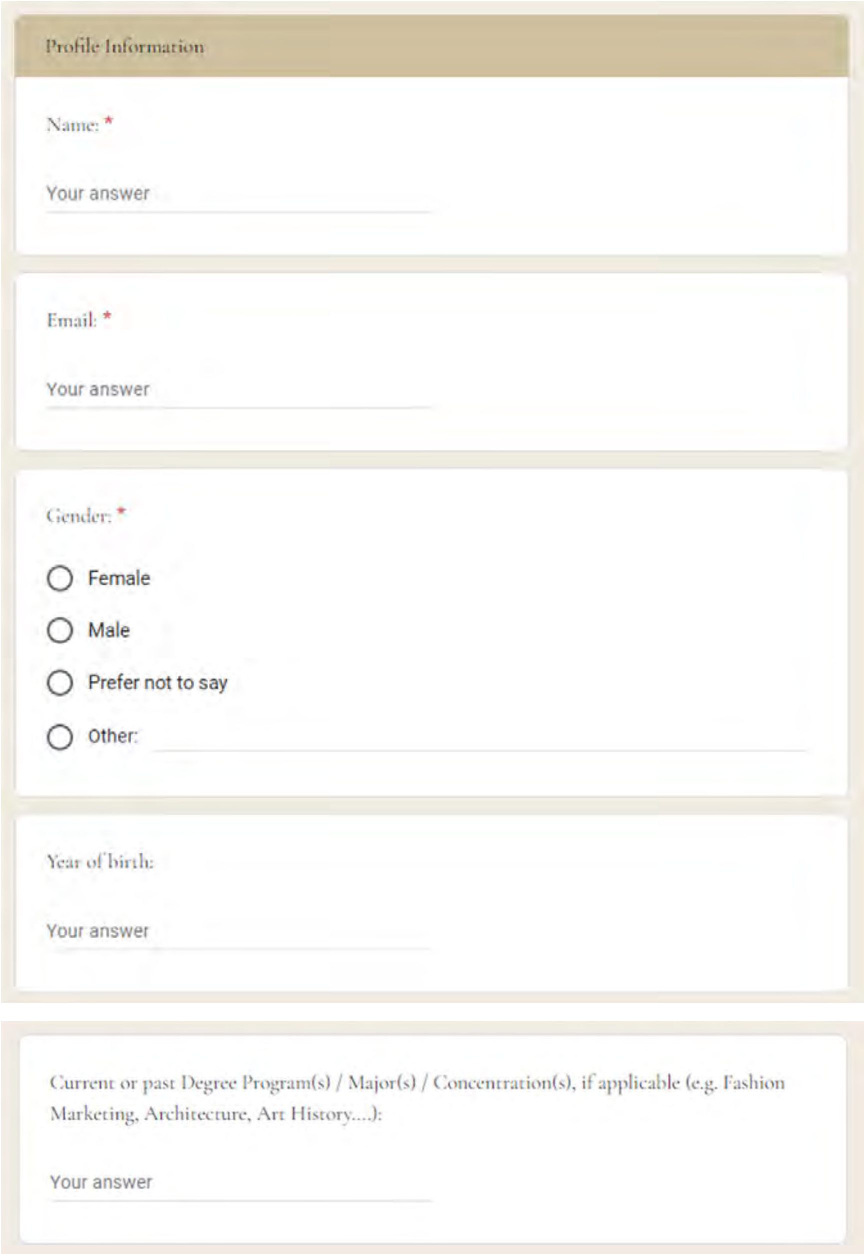
You are invited to participate in this "Knitted Swatch Survey", in which you will be asked to provide input on images of knitted textiles. The entire survey should only take 5-10 minutes to complete. There are no foreseeable risks from taking part in this survey, however your participation is completely voluntary and you can withdraw at any point if you do not feel comfortable with proceeding. Your responses may be used in future research and/or published, however your personal details will be kept strictly confidential and only used in the aggregate whereby individual data subjects will not be identified. You may review the detailed information sheet via the link provided below. If you have further questions, please feel free to contact Jennifer Wu by phone (+852 6034) or email (xiaopei.wu@).
Thank you for your participation!
https://drive.google.com/file/d/17cxOAkbQ12lpHmxUiTmCQc9fZxCF1iGy/view?usp=sharing

By clicking "I agree" below, you are consenting to participate in the this research survey and confirming your understanding of your rights and terms of involvement as described above: *

- I agree
- I disagree

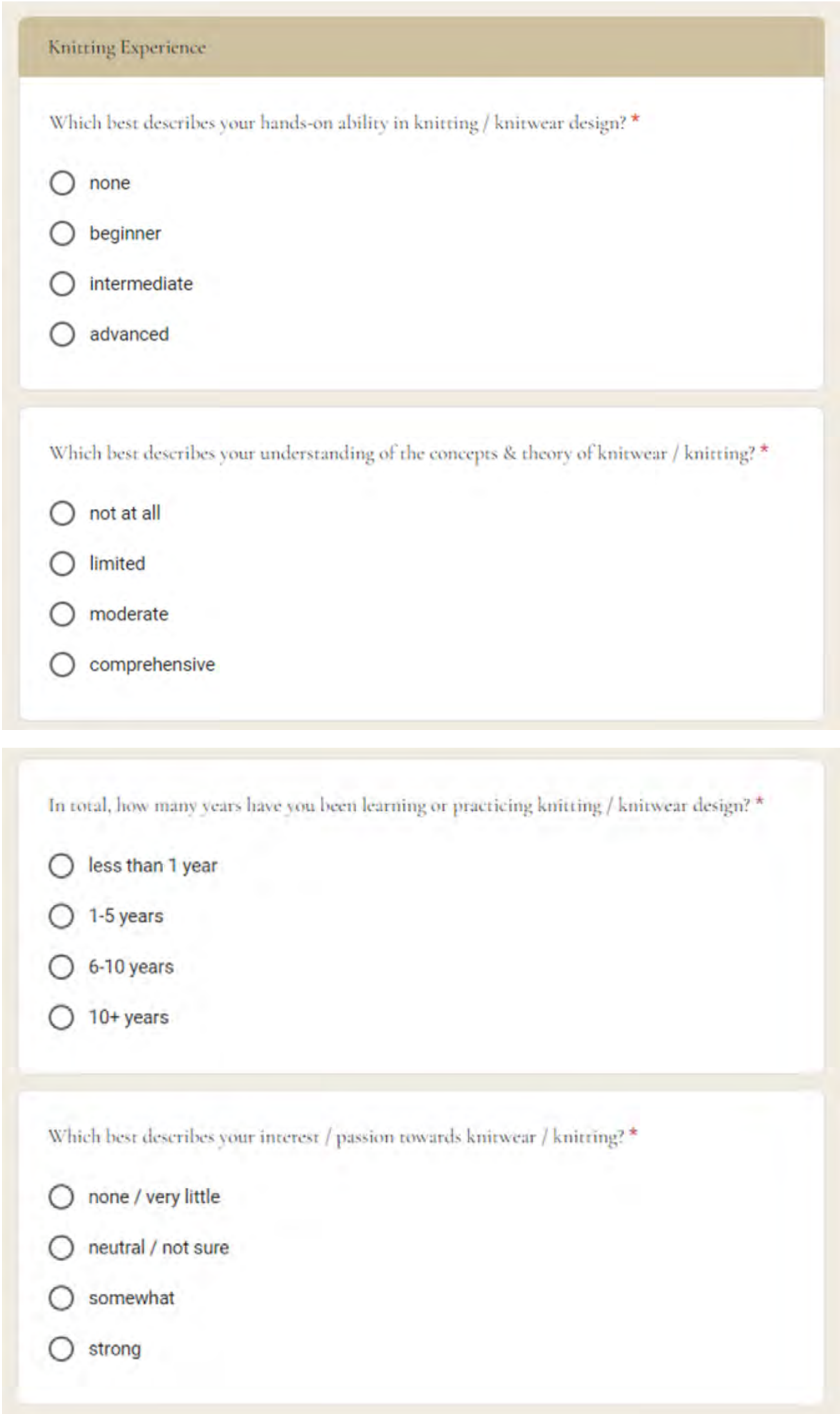
After consenting to the conditions, the questionnaire requests the participants profile information, including their name, contact email (these were intended for contacting purposes), gender, year of birth and field of study or work (these were intended to account for any influences or biases on the later responses) (Figure 27).

Figure 27: Screenshot of Questionnaire profile information page



Next, the questionnaire asked questions to gauge to the participant's knitting experience (theoretical and practical) and interest (these were intended to account for any influences or biases on the later responses) (Figure 28).

Figure 28: Screenshot of Questionnaire knitting experience questions


Knitting Experience

Which best describes your hands-on ability in knitting / knitwear design? *

- none
- beginner
- intermediate
- advanced

Which best describes your understanding of the concepts & theory of knitwear / knitting? *

- not at all
- limited
- moderate
- comprehensive

In total, how many years have you been learning or practicing knitting / knitwear design? *

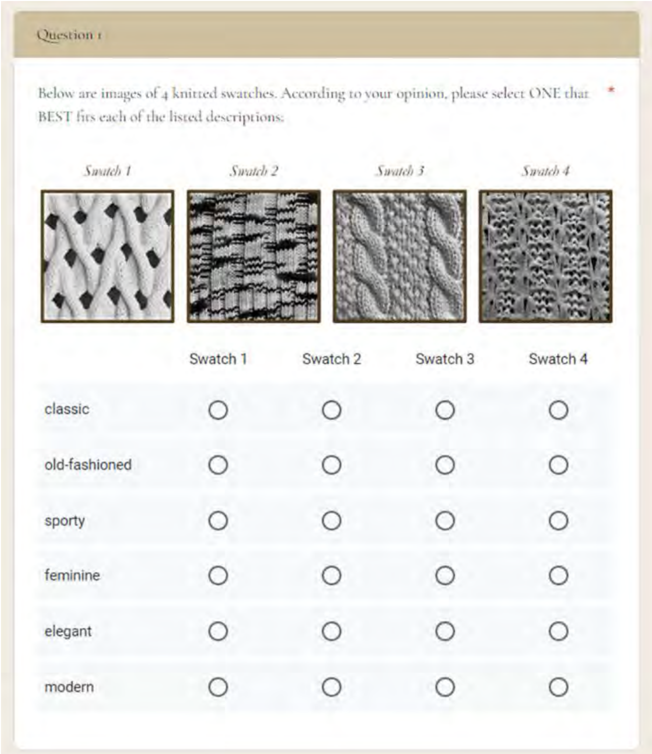
- less than 1 year
- 1-5 years
- 6-10 years
- 10+ years

Which best describes your interest / passion towards knitwear / knitting? *

- none / very little
- neutral / not sure
- somewhat
- strong

Next, the questionnaire proceeds to 5 questions (Figure 29 to Figure 33) which requires participants to review given images of knitted textiles (as swatches and as garments) and rate their visual appearance in terms of qualitative traits. Each of these questions presents 4 knitted textile swatch or knitted garment images, 2 of which are photos of real existing physical swatches and another 2 which are images generated by the AI based computational method, in a random order without indicating which is which. (According to Objective 3, these 5 questions are intended to evaluate the qualitative attributes i.e. "creative value", of the AI-generated images versus the real ones).

Figure 29: Screenshot of Questionnaire Question 1



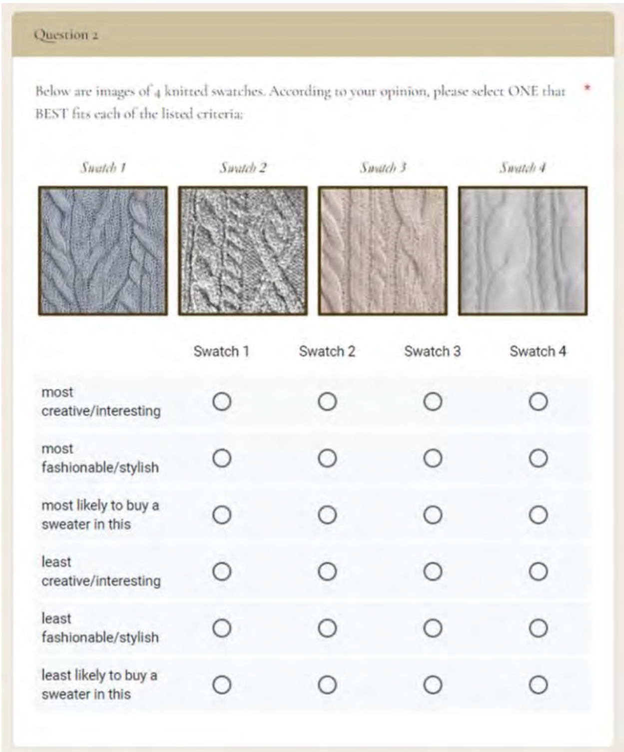
Question 1

Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed descriptions: *

Swatch 1 Swatch 2 Swatch 3 Swatch 4

	Swatch 1	Swatch 2	Swatch 3	Swatch 4
classic	○	○	○	○
old-fashioned	○	○	○	○
sporty	○	○	○	○
feminine	○	○	○	○
elegant	○	○	○	○
modern	○	○	○	○

Figure 30: Screenshot of Questionnaire Question 2



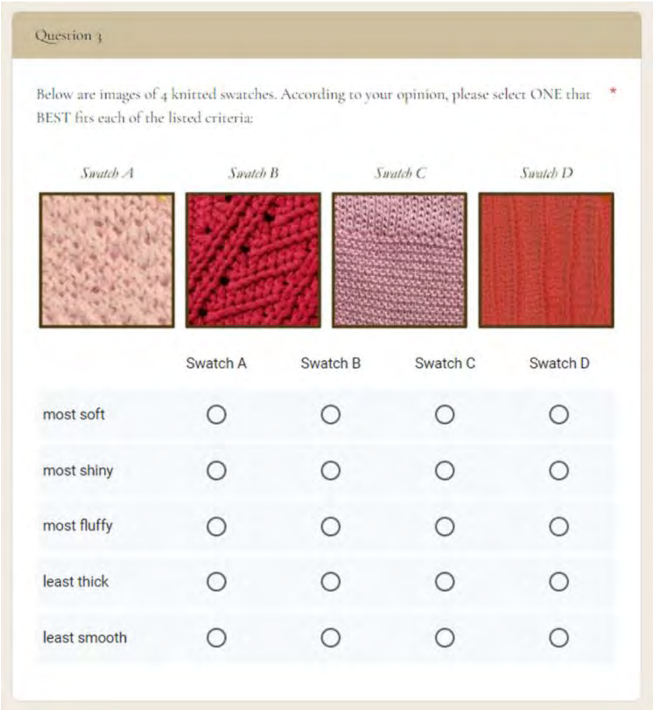
Question 2

Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria: *

Swatch 1 Swatch 2 Swatch 3 Swatch 4

	Swatch 1	Swatch 2	Swatch 3	Swatch 4
most creative/interesting	○	○	○	○
most fashionable/stylish	○	○	○	○
most likely to buy a sweater in this	○	○	○	○
least creative/interesting	○	○	○	○
least fashionable/stylish	○	○	○	○
least likely to buy a sweater in this	○	○	○	○

Figure 31: Screenshot of Questionnaire Question 3

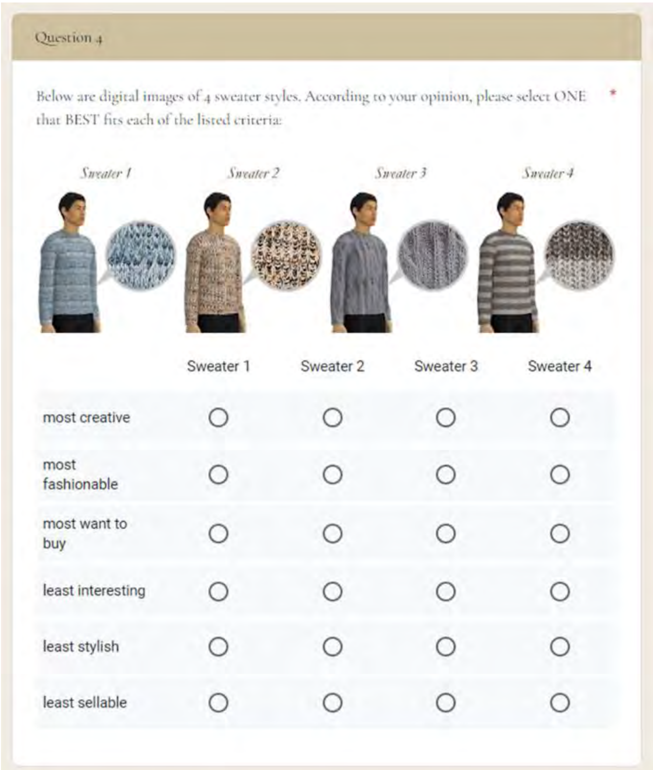


Question 3

Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria: *

	Swatch A	Swatch B	Swatch C	Swatch D
most soft	○	○	○	○
most shiny	○	○	○	○
most fluffy	○	○	○	○
least thick	○	○	○	○
least smooth	○	○	○	○

Figure 32: Screenshot of Questionnaire Question 4

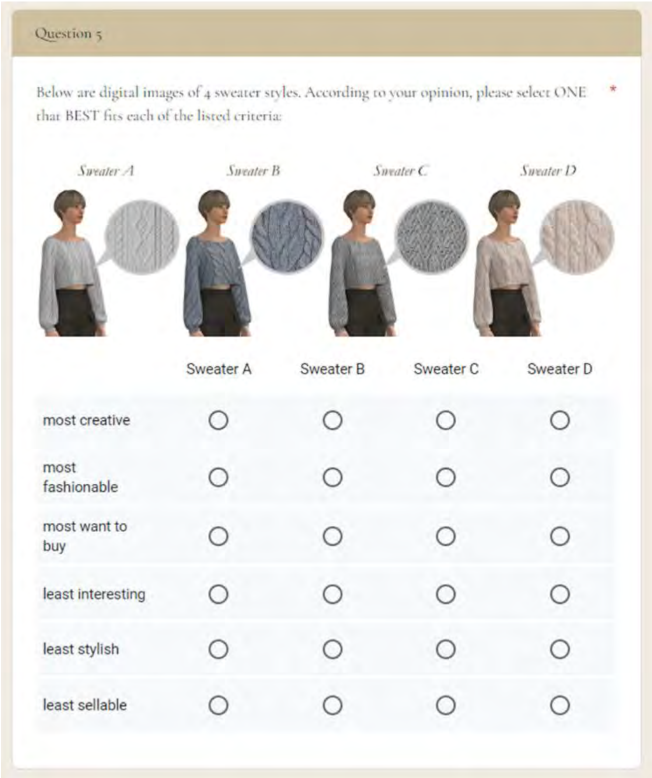


Question 4

Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria: *

	Sweater 1	Sweater 2	Sweater 3	Sweater 4
most creative	○	○	○	○
most fashionable	○	○	○	○
most want to buy	○	○	○	○
least interesting	○	○	○	○
least stylish	○	○	○	○
least sellable	○	○	○	○

Figure 33: Screenshot of Questionnaire Question 5



3.5.1.1 Questionnaire Triangulation

The design of the survey factored in triangulation in various ways:

- In the visual presentation of the knitted textile images, to best disguise the AI generated images amongst the photos of real knitted textiles, and reduce potential distractions or noise, the images chosen for each question were of similar colour or like colours were shown in equal quantities. The images were presented in a clean uniform manner, cropped, framed, and aligned in the same format, again to eliminate distraction.
- To catch any response biases, some the adjective descriptors were listed again in the same question, but as a negative. To ensure that both positive and negative versions of the question were answered alike.
- Questions 1-3 were based on knitted swatch images, whilst Questions 4-5 were based on knitted garment images (by projecting knitted textile images onto clothed avatars), to see if the means of presenting the knitted textile image had any impact on the responses.

3.5.2 *Design of Interview*

According to Objective 3, the purpose of the interview portion of this research study is to evaluate the practical utility of the computational method for knitted textile design in the fashion industry's creative design process. This involved conducting interviews with industry professionals to help evaluate if the designs generated by the computationally creative method have practical utility in the context of a real-world industry design process. The methodological design of the interviews was as follows:

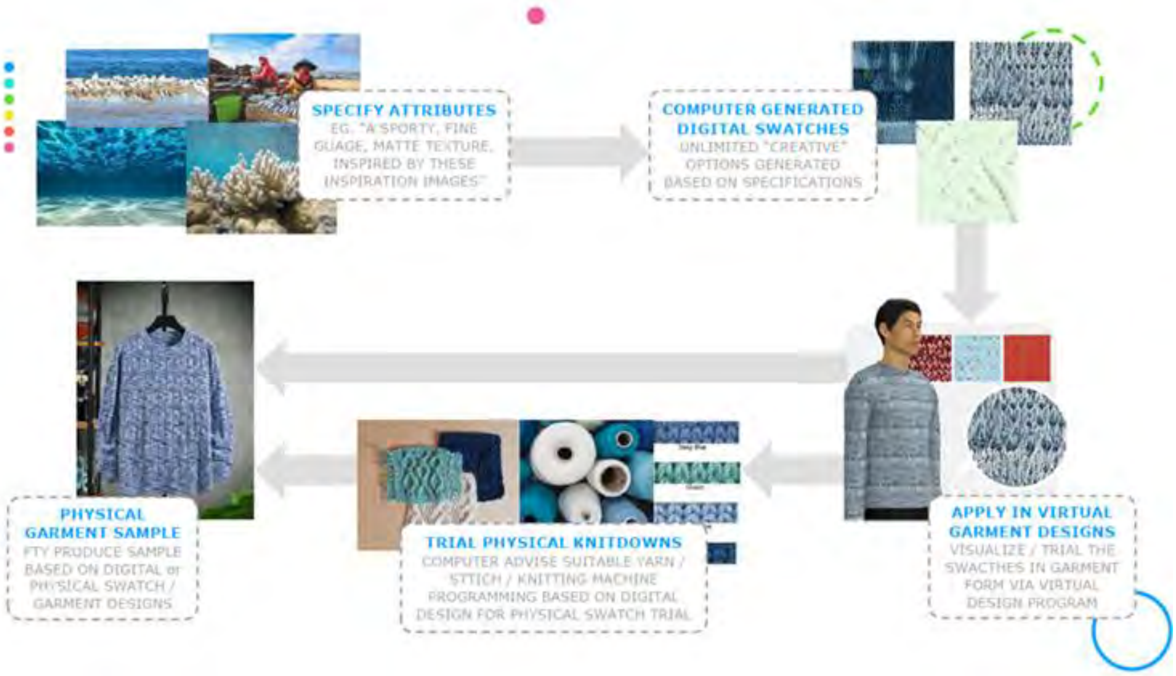
- Format: virtual one-on-one interview (via online meeting platform MS Teams enabling video and audio recording / transcripts)
- Timing: conducted between Jan-April 30th, 2022, each interview taking 30-45 minutes to complete
- Interviewees: 5-10 interviewees, fulfilling the criteria of at least 3 years work experience in the fashion industry with a focus on the knitwear field.
- Procedure: Prior to each interview, the interviewee was asked to complete the questionnaire of this study. During the interview, the contents and images of the questionnaire, along with additional samples of computer-generated knitted swatch images produced by Objective 2 of the study, were referenced. Prior to the interview, interviewees were asked to fill out an online consent form as well as complete the survey questionnaire described in Section 3.5.1 Design of Survey Questionnaire. In the interview, the interviewees were asked the following set questions:

    (a) Describe your understanding of artificial intelligence and its applications in the fashion industry?
    (b) How (have you seen / can you see) artificial intelligence helping or hindering the creative design process in fashion and in the knitwear category specifically?
    (c) In your opinion, do you think artificial intelligence can facilitate the creative design process in a practical way, now or in the future?
    (d) Considering the computer-generated knit swatch images presented here and in the survey, if, for example, the digital design programs that you use now had the capability to autonomously generate unlimited "new swatch design options" (varying in stitch, yarn quality, gauge, colour), which could be developed into the fashion designs, how

much do you think this would facilitate the design process in terms of (a) creativity (b) work efficiency (c) marketability? (Reference visual flowchart shown in Figure 34)

Depending on how the conversation progressed and evolved, further supplemental questions were inserted, however the above were the key objective questions the interview focused on.

Figure 34: Flowchart of hypothetical creative fashion design process with integration of proposed computational creative method



CHAPTER 4: RESULTS & DISCUSSION

4.1 Introduction

This chapter will present and discuss the results of the empirical research objectives of this study, Objectives 2 & 3 respectively. Especially as the results are based on a visual medium, figures will be relied on to convey the results.

4.2 Results & Discussion of Research Objective 2

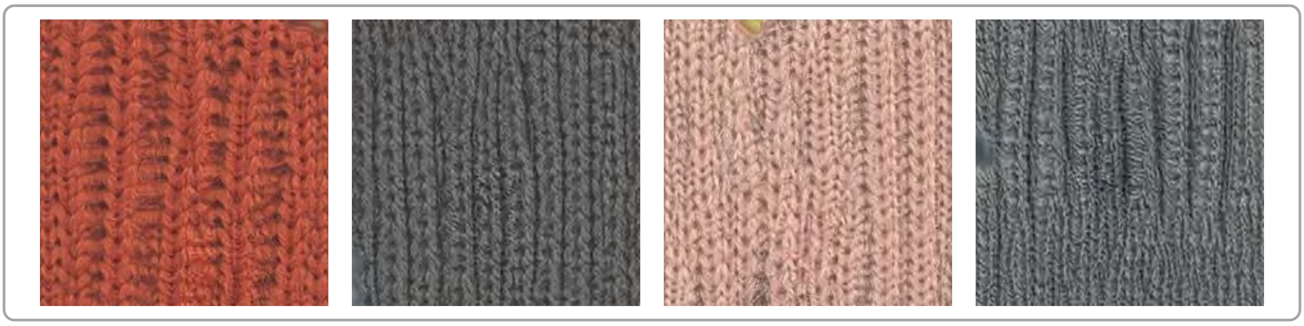
The 1st and 2nd experiment variations were conducted in an exploratory manner, to gain some quick learning on the effectiveness of applying computational models to knitted designs. The 1st experiment variation although broke down the knitted design in stitch units, which is helpful in capturing the underlying technical elements accurately, but the process of compiling data for such a method was too manual and time-consuming, and limiting towards achieving creative results. The exploratory purpose of the 2nd experiment variation was to test whether a computational deep learning model (a CNN was used) could distinguish the subtle details distinguishing knitted from woven textiles images. The best validation accuracy achieved was 75% which was still encouraging considering the very small dataset (compared to industry standards) and limited tweaks to the model variables. Although the training time was also extremely long (2-5 hours depending on the learning rate, epochs, colour vs. grayscale).

The 3rd and 4th experiments which applied a GAN model via online SDK platform "RunwayML" (website: https://runwayml.com/), generated output images of knitted textile designs which were collectively definitive and interesting, however some individually were ambiguous and indiscriminate. Figure 13 shows a selection of the most definitive and interesting (according to authors subjective opinion) output images generated from the 3rd and 4th experiments. Figure 35 shows a selection of output images generated from 4th experiment variation.

Figure 35: Selection of images output by computational method devised for 4th experimental variation

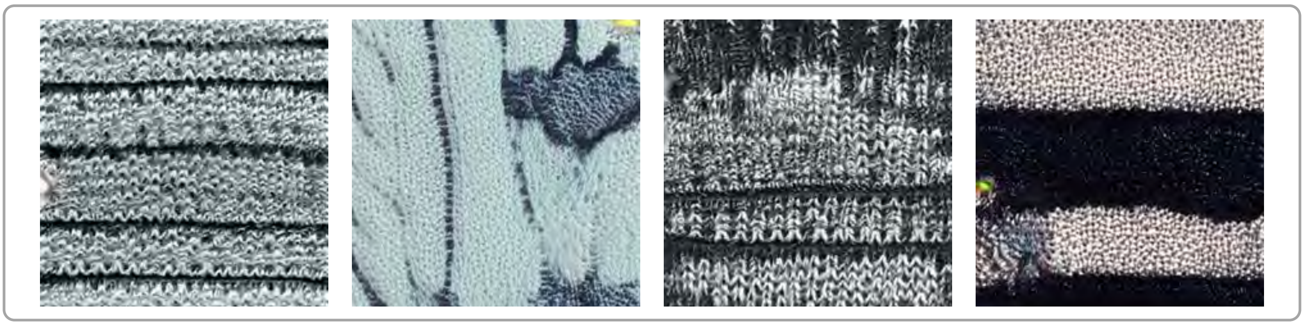
The majority of output generated images were definitive enough to be interpreted as representing knitted textiles. The generated images captured recognizable knitted textile technical attributes, such as:

- Rib structure



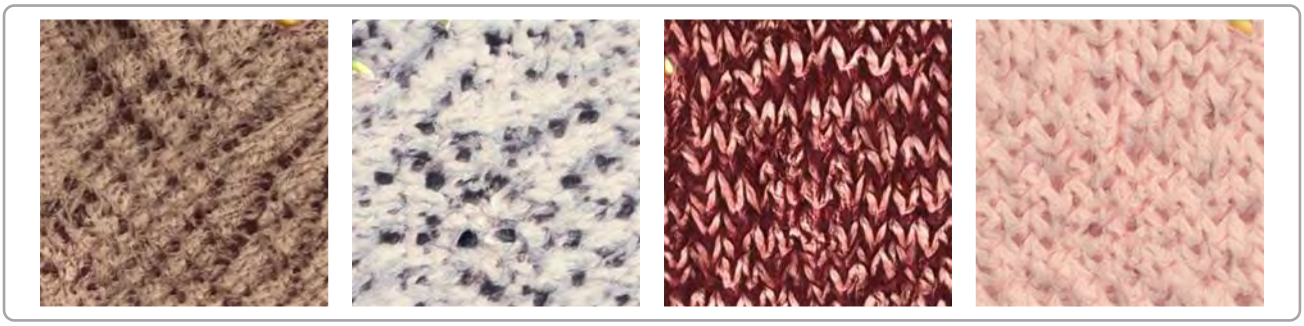
- Cable structure

- Stripe pattern

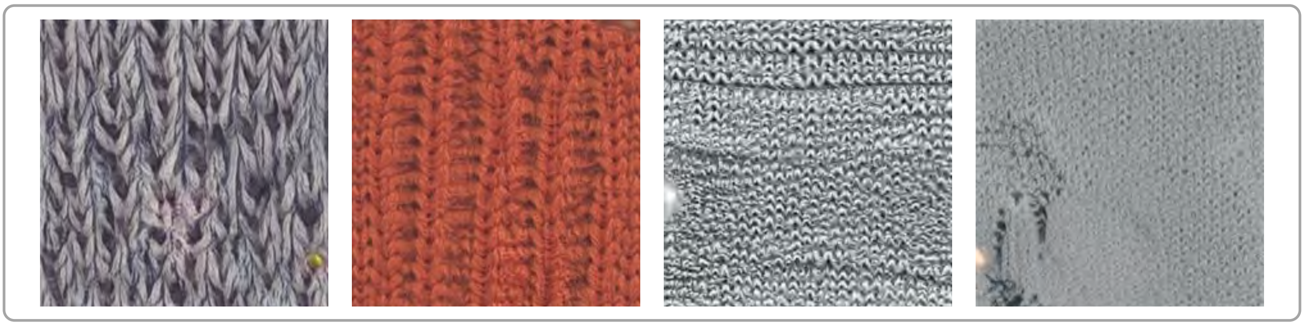


- Pointelle, Drop stitches or Loose tension

- Lofty handfeel



- Heavy gauge vs fine gauge



There were also image generations which could be considered indistinct and distorted – skewing from the reality of real knitted textiles:

- Indistinguishable

A selection of the generated images from Figure 35 were then translated into physical form. They were sent to an industrial knitting factory and interpreted by the technicians into physical knitted textile swatches. The results of the generated image alongside its physical interpretation expand the practical and theoretical significance of this study to include its potential as a knitted textile design generator for fashion’s design & development process.

- Factory knitted swatches

One of the purposes of conducting the 3rd experiment variation was to see if by removing color from the images (i.e. with the grayscale dataset) produce any difference in (perhaps enhance) the other detail of the designs. However, the output image results show that there was little impact; the images output from the grayscale dataset were no more detailed than the ones output from the RGB dataset. Also, it seems that the color of the images output from the RGB dataset were washed out and looked like a separate uniform layer of color over the knitted textile, instead of being integrated into the actual details of the knitted textile. The 4th experiment variation generated output images which collectively were very representative of cable stitches, however as shown in above "indistinguishable" generated image examples, there was a range of how realistic they looked, with some having a very surreal quality, but nonetheless interesting.

4.3 Results & Discussion of Research Objective 3

Research Objective 3 requires an empirical evaluation of the devised computational method, in terms of the creative value and practical utility derived from its application in the fashion creative design process. A survey and interviews were conducted to address this objective. The responses to the survey and interviews are presented below in graphical format with accompanying discussion.

4.3.1 Survey Questionnaire

The questionnaire acquired a total of 211 participant responses. The collective profile of these 211 participants is summarized is Table 4 below, showing the distribution of their genders, ages, fields if study or work, years of experience with knits, hands-on knitting ability, and theoretical knit understanding, based on their responses to the beginning profile questions.

Table 4: Questionnaire 1 Participants Profile Responses

<table>
<tr><th>QUESTION SUBJECT</th><th colspan="5">DISTRIBUTION OF RESPONSES (number of participants)</th></tr>
<tr><td rowspan="2">GENDER</td><td>MALE</td><td colspan="4">FEMALE</td></tr>
<tr><td>45</td><td colspan="4">165</td></tr>
<tr><td rowspan="2">AGE (in 2022)</td><td>18-24</td><td>25-34</td><td>35-50</td><td>50+</td><td>UNSPECIFIED</td></tr>
<tr><td>123</td><td>36</td><td>16</td><td>9</td><td>27</td></tr>
<tr><td rowspan="2">FIELD OF STUDY / WORK</td><td>fashion</td><td>engineering</td><td>design</td><td>knitwear</td><td>marketing</td></tr>
<tr><td>86</td><td>10</td><td>53</td><td>4</td><td>27</td></tr>
<tr><td rowspan="2">YEARS OF EXPERIENCE WITH KNITS</td><td colspan="2"><1</td><td>1-5</td><td>6-10</td><td>10+</td></tr>
<tr><td colspan="2">174</td><td>23</td><td>4</td><td>10</td></tr>
<tr><td rowspan="2">HANDS-ON KNITTING ABILITY</td><td>none</td><td colspan="2">beginnner</td><td>intermediate</td><td>advanced</td></tr>
<tr><td>76</td><td colspan="2">105</td><td>23</td><td>7</td></tr>
<tr><td rowspan="2">THEORETICAL KNIT UNDERSTANDING</td><td>not at all</td><td colspan="2">limited</td><td>moderate</td><td>comprehensive</td></tr>
<tr><td>44</td><td colspan="2">123</td><td>33</td><td>11</td></tr>
<tr><td rowspan="2">LEVEL OF INTEREST IN KNITWEAR</td><td>neutral / not sure</td><td>none / very little</td><td colspan="2">somewhat</td><td>strong</td></tr>
<tr><td>68</td><td>45</td><td colspan="2">77</td><td>21</td></tr>
</table>

The gender was heavily skewed towards female, and age towards the 18-24 range. This is representative of the fact that a great deal of participants were students at the fashion school in the Investigators academic network, which is apparent in the distribution of field of work / study. This was preempted and believed not to be a deterring factor to the results. In fact, the fashion background may even prove beneficial to the integrity of the responses. Knitwear specific expertise was overall not predominant, which encourages a more balanced perspective on the knitted textile images.

The responses to survey Questions 1-5 are presented in Figure 36 – which indicates the percentage of participants that selected each corresponding response, and was conditionally formatted with heat map color key effect according to the percentage (the higher the percentage the "warmer" the color; the lower the percentage "cooler" the color), to enable easy interpretation.

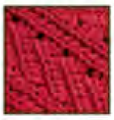
On the left side are labels indicating which of the knitted textile image options in each question was based on a real swatch ("REAL") or an AI generated image ("AI"). This distinction was hidden from the participants. The responses indicate first of all that the AI generated knitted textile images were judged with the same level of discernment as the real swatch photos.

The responses to Question 1 indicate a consensus towards the aesthetic or style of a knitted textile, as subjective as it is, with responses clearly weighed towards some swatches over others. There was a particularly strong consensus towards Classic as a descriptor. The purpose of Question 1 was to provide a validation for the proceeding questions, that there is statistical significance in evaluating knitted textile images based on subjective aesthetic or style descriptors.

Figure 36: Graphic representation of Survey Questionnaire responses (Question 1-5)

	QUESTION 1						
	Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed descriptions	CLASSIC	OLD FASHIONED	SPORTY	FEMININE	ELEGANT	MODERN
(REAL)		18%	11%	37%	20%	21%	42%
(REAL)		13%	28%	46%	11%	8%	28%
(REAL)		64%	38%	8%	27%	41%	10%
(REAL)		4%	22%	9%	42%	30%	19%

	QUESTION 2						
	Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria.	MOST CREATIVE / INTERESTING	MOST FASHIONABLE / STYLISH	MOST LIKELY TO BUY A SWEATER IN THIS	LEAST CREATIVE / INTERESTING	LEAST FASHIONABLE / STYLISH	LEAST LIKELY TO BUY A SWEATER IN THIS
(AI)		41%	36%	22%	14%	16%	21%
(REAL)		35%	25%	14%	21%	31%	41%
(AI)		10%	21%	43%	24%	21%	14%
(REAL)		14%	18%	21%	41%	32%	24%

	QUESTION 3					
	Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:	MOST SOFT	MOST SHINY	MOST FLUFFY	LEAST THICK	LEAST SMOOTH
(AI)		70%	4%	56%	5%	12%
(REAL)		10%	20%	26%	12%	44%
(REAL)		7%	72%	7%	39%	28%
(AI)		13%	4%	11%	44%	16%

	QUESTION 4						
	Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE
(AI)		27%	26%	31%	11%	10%	13%
(REAL)		39%	36%	19%	15%	26%	34%
(AI)		26%	29%	36%	23%	19%	23%
(REAL)		7%	9%	14%	51%	45%	30%

	QUESTION 5						
	Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE
(REAL)		27%	27%	35%	19%	22%	13%
(AI)		43%	35%	24%	13%	14%	18%
(REAL)		19%	17%	18%	53%	50%	55%
(AI)		11%	22%	24%	15%	14%	13%

Note that Question 2, 4 and 5 were structured in the same way, with:

- 3 positive statements ("MOST CREATIVE / INTERESTING", "MOST FASHIONABLE / STYLISH" and "MOST LIKELY TO BUY A SWEATER IN THIS"), towards the left side
- and 3 negative statements ("LEAST CREATIVE / INTERESTING", "LEAST FASHIONABLE / STYLISH" and "LEAST LIKELY TO BUY A SWEATER IN THIS"), towards the right side

This was designed for participants to rate each of the 4 knitted textile swatch or garment options by.

To furthermore help gauge the level of positivity or negativity the AI generated images received versus the real images, a scoring system was implemented, shown in Figure 37, whereby the respective response percentages of each knitted textile swatch/garment option were treated as integers and 'totaled up' by *adding up* the percentages of the positive statements, and *subtracting* the percentages of the negative statements. The totaled or "BALANCED SCORE" for each knitted textile swatch/garment option is shown in the right-hand columns in Figure 37, and also color coded according to the same heat map color key. Then the amalgamation of all the "BALANCED SCORE's" for Question 2, 4 and 5 is shown at the bottom of Figure 37, which also shows overall how the AI generated images scored compared to the real images. Based on this scoring system presented by Figure 37, the AI generated images collectively scored +212 points, while the real images collectively scored -211. This is a stark contrast and strong validation for the AI generated knitted textile images.

Figure 37: Scoring of Survey responses to Question 2,4,5

QUESTION 2 (POSITIVE: first three criteria; NEGATIVE: last three criteria)

	Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria	MOST CREATIVE INTERESTING	MOST FASHIONABLE STYLISH	MOST LIKELY TO BUY A SWEATER IN THIS	LEAST CREATIVE INTERESTING	LEAST FASHIONABLE STYLISH	LEAST LIKELY TO BUY A SWEATER IN THIS	BALANCED SCORE
(AI)		41%	36%	22%	14%	16%	21%	+ 49
(REAL)		35%	25%	14%	21%	31%	41%	- 18
(AI)		10%	21%	43%	24%	21%	14%	+ 15
(REAL)		14%	18%	21%	41%	32%	24%	- 45

QUESTION 4 (POSITIVE: first three criteria; NEGATIVE: last three criteria)

	Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE	BALANCED SCORE
(AI)		27%	26%	31%	11%	10%	13%	+ 51
(REAL)		39%	36%	19%	15%	26%	34%	+ 19
(AI)		26%	29%	36%	23%	19%	23%	+ 26
(REAL)		7%	9%	14%	51%	45%	30%	- 96

QUESTION 5 (POSITIVE: first three criteria; NEGATIVE: last three criteria)

	Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE	BALANCED SCORE
(REAL)		27%	27%	35%	19%	22%	13%	+ 34
(AI)		43%	35%	24%	13%	14%	18%	+ 55
(REAL)		19%	17%	18%	53%	50%	55%	- 105
(AI)		11%	22%	24%	15%	14%	13%	+ 16

	BALANCED SCORE		BALANCED SCORE		BALANCED SCORE
(AI)	+ 49	(AI)	+ 51	(REAL)	+ 34
(REAL)	- 18	(REAL)	+ 19	(AI)	+ 55
(AI)	+ 15	(AI)	+ 26	(REAL)	- 105
(REAL)	- 45	(REAL)	- 96	(AI)	+ 16

(AI)	+ 49	+ 15	+ 51	+ 26	+ 55	+ 16	+ 212
(REAL)	- 18	- 45	+ 19	- 96	+ 34	- 105	- 211

Another observation is that Question 2 responses show that the two AI generated knitted textile images (Swatch 1 and 3) were most selected for the 3 positive statements of “MOST CREATIVE / INTERESTING”, “MOST FASHIONABLE / STYLISH” and “MOST LIKELY TO BUY A SWEATER IN THIS”. Likewise the two photographs of real knitted textile images were most selected for the 3 negative statements of “LEAST CREATIVE / INTERESTING”, “LEAST FASHIONABLE / STYLISH” and “LEAST LIKELY TO BUY A SWEATER IN THIS”. This suggests a clear potential for knitted textile designs generated by this study’s computational method.

Also Question 3 responses showed a clear consensus towards the interpretation of hand feel based on the knitted textile images. This indicates that the computational method generated images as well as photographs of knitted textiles in general have sufficient visual dimensionality and finesse to convey the subtlety of the knitted textiles texture and tactile elements to a notable extent.

Question 4 and 5 are the male and female garment counterparts of the same question. Although the computational method generated knitted textile images did not receive the most votes for the positive statements, they were among the top selected. The photographs of real knitted textiles received the most votes for the negative statements. This overall indicates that the computational method can produce comparable knitted textile designs as real knitted textiles designed by humans. The data is not sufficient to show the designs generated by the computational method were better per say, but there is strong enough indication that they were considered on equal aesthetic ground with the real knitted textiles designed by humans.

4.3.2 Interviews

As a reminder, the set interview questions for the interviewees were as follows:

(1) QUESTION 1: Describe your understanding of artificial intelligence and its applications in the fashion industry?
(2) QUESTION 2: How (have you seen / can you see)* artificial intelligence helping or hindering the creative design process in fashion and in the knitwear category specifically?
(3) QUESTION 3: In your opinion, do you think artificial intelligence can facilitate the creative design process in a practical way, now or in the future?
(4) QUESTION 4: Considering the computer-generated knit swatch images presented here and in the survey, if, for example, the digital design programs that you use now had the capability to autonomously generate unlimited “new swatch design options” (varying in stitch, yarn

quality, gauge, colour), which could be developed into the fashion designs, how much do you think this would facilitate the design process in terms of (a) creativity (b) work efficiency (c) marketability?

The responses of each interviewee to these questions are detailed in Table 5 and Table 6.

Table 5: Collated Interview Responses (Interviewees 1-5)

		QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4
Interviewee	Background / Current Job Role	**Describe your understanding of artificial intelligence and its applications in the fashion industry?**	**How (have you seen / can you see)* artificial intelligence helping or hindering the creative design process in fashion and in the knitwear category specifically?**	**In your opinion, do you think artificial intelligence can facilitate the creative design process in a practical way, now or in the future?**	**Considering the computer-generated knit swatch images presented here and in the survey, if, for example, the digital design programs that you use now had the capability to autonomously generate unlimited "new swatch design options" (varying in stitch, yarn quality, guage, color), which could be developed into the fashion designs, how much do you think this would facilitate the design process in terms of (a) creativity (b) work efficiency (c) marketability?**
1	Knitwear designer at mass market vertical private label knitwear company	"not familiar with it at all. I wasn't sure it was being used" but aware of "digitization of certain processes like fittings" and "human aided sides of technology as opposed to...fully computerized systems"	Only has firsthand experience of general digital tools invovled in current design process - approximates "25%" extent of involvement, mostly in form of digital renderings of swatch or garment designs via Kaledo (virtual knit design program).	"Yes and no". Have heard of "a software that takes ...best sellers and creates new styles out of it...But even within that you have to have...some sort of [human] input... It's not like it can just...form those ideas on its own". Also might be "too expensive to scale" for mass market.	"I think it's extremely realistic" / "easily adopted" - in reference to the proposed computational method, since current way of working already reliant on selling or even go to production via CADs (with one reference sample to feel) vs physical samples. As long as can "deliver something that looks like the picture" and develop "trust...between your vendor and your process". Beleive "it's 90% achievable" and barrier might be "the information gap between the designer and the machinery [capabilities]". Beleives can help designer be more creative "because [they] don't have to know everything...And so...can play...and see...what comes out of it...there is freedom...just know...what I want the end product to be...Allows me to just be more playful and...even try things that...maybe they didn't think they could do...". Would "[somehwat] improve efficiency" but might be "a learning curve" to adopt at first
2	Knitwear designer at high-end fashion house	"heard of it...even...artificial intelligence that actually designs" but never used it in their career.	"AI to me is a bit scary too...it's like no limits to it.". But can see it benefiting the design process by "pull[ing] analysis from past histories...identify...the strong the key elements of a design...what...was working...And filter those out...highlight them and...pull...history from past...sales...or colors too...Something like that I think could be beneficiary". See benefit of digital support tools for organizational purposes "where you store all your present past information and you can sort it in different ways and you can look up different information". Current job uses digital design tools in the form of Adobe CS, virtual meeting platrofrms, online server shared drive, Excel techpacks...but design sketching still done by hand, and swatch development process still reliant on physical samples, although can oftentimes "comment off of pictures" which partly influenced by the practices adopted during COVID. Even during COVID, mills sent their entire yarn collection books physically to clients.		"don't think something like that can really replace the human designer...it might be...a support...helpful for an initial... direction if you're completely lost...but it definitely takes I think it takes the fun out of it. It takes the passion out of it and it loses all the the appeal of what fashion is in the 1st place...You're probably going to get...wearable clothing out of it...but it's probably gonna be hit or miss...although...I know...these programs are very sophisticated and they're getting better and better, but I think it's probably gonna be a little bit random...especially with knitwear, where you really have to go in and...study it...to envision it...you have no idea how it's gonna look like if...yarns are combined in a certain stitch. So...sometimes you just gotta do the try the unexpected, make combinations that you know. Maybe you wouldn't really do otherwise, and that's how you get that great, exciting novelty."
3	Knitwear designer at mass market vertical private label knitwear company	In fashion context, "3D" design software comes to mind. Also harnessing big data via search engines to forecast trends	Refers to Shima Seiki's "APEX All-in-One" digital design system which enables fully seamless digital design experience from yarn to swatch to garment. But expensive to implement at a commercial scale. Digital knit design tool currenlty use the most is Kaledo: to create knit CAD designs, which are used to sell to buyers, reducing physcial samples. But CADs lack in realism / dimensionality.	Can see it benefitting layout design and options, but with material component i.e. yarn, being able to physically touch it is important in creative design process. Physical swatch still integral to accompany selling off CADs and integral reference to inform the early design sketch stage.	With digital tools such as Kaledo, although expensive, believes can help: (a) creativity (b) work efficiency (c) marketability. The proposed computational model would be "super helpful" maybe for "high-end fashion" houses that have small quantities , but only partly helpful for "mass market" brands: can see it being helpful for yarn mills when they develop swatch designs for their yarn collection books (which will indirectly be able to inpire designers if they reference them when designing)
4	Director of Product Development at global luxury fashion brand	"Not much". Think of "3D" design software.	"I think depends where you work and how you work". Doesnt think artificial intelligence or even 3D design / sampling digital tools would work in "a highly creative company or a high fashion company", as they are "driven by see and touch", but may work for "a company that is more price conscious". Can see it benefitting quicker development turnaround time. Currently 3D digital design software CLO "only utilized for [technical design] pattern making a little bit and it's not even utilized properly...I think because there's such a lack of need or wanting it that the company's not even investing that much time or resources into it..."	"specifically speaking for [our company]", deterred by the need to see physical samples e.g. "even during the pandemic, we were...shipping samples...to peoples homes...because [the CEO} wanted to see everything". When tried to incorporate digital designs, was ok for reference but ultimately physical sample still requested for approval.	"probably could be utilized halfway…don't see it being like the full cycle". Can see it e.g. generating swatches from inspiration photos, which are then set to factory to knit physical samples of. But don't see the continuation of the process into garment sampling and production. But expect that "in 5-10 years…going to be…new world of young designers…they're all taking these classes in school" that will embrace such computational method, unlike the "more senior" designers that would be "against it" as they are set in conventional ways of working e.g. "want to do things in Excel". Although see digital tools being helful bu reducing admin burdens from designers to enable them to focus energies on creative tasks, its more likely to be something only younger generation of designers will embrace. For highly creative company like this one, at the moment the need iterate the design is greater than the potential timing & sustainability benefits of adopting digital tools.
5	Technical Designer at global luxury fashion brand	Think of "algorithm[s]...they're using for...marketing...in terms of actual manufacturing...automation…a utomated footwear factory". But "in terms of actual garment manufacturing…its still the human touch"	Can see it facilitating "direct to consumer" models by providing data to inform design decisions. See it more suitable for "contemporary" brands that have more pressure to cut costs / reduce overdevelopment as opposed to "luxury market" which will remain "human involved". "[Our company] tried to use CLO…specifically…for repeat styles that were coming in different…prints to figure out print layouts for bulk and T shirts because T shirts…[are the same]…two or three blocks and with…a graphic on it that they would just need to…place or…figure out the different sizes…And CLO was not embraced by design" even though tech / PD believed it would help reduce sampling and leadtime, because "the designers at the end of the day still want to see [the sample] in person" or possibly because avatar looks unrealistic / unrelatable. Woven technical designers (not creative designers) trained to use CLO, and seems is also more easily picked up by younger generation. But have experienced the factory's sending 3D digital renderings of sweaters (without body) to convey various stitch options, which designers responded positively towards. During COVID, fit samples sent btwn hk to nyc, and even to fit model for her to pin on herself.		Can see it helping to visualize options digitally, and reducing physical swatch sample load, but not completely elimitaing it since designers still need "tactile" reference for final approval, especially as the higher up creatives "who are making decisions don't necessarily understand [or visualize]...how [sketch and a swatch] go together". For novelty stitches, physical reference may be more neccesary, so perhaps computational model is more suitedfor certain types of designs e.g. basic stitch styles or repeats. Design sketching method is evolving: incoproating common digitial tools / devices (e.g. IPad and Procreate), to sketch / present swatch images digitally in [CEO] approval meetings.

Table 6: Collated Interview Responses (Interviewees 6-10)

		QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4
Interviewee	**Background / Current Job Role**	**Describe your understanding of artificial intelligence and its applications in the fashion industry?**	**How (have you seen / can you see)* artificial intelligence helping or hindering the creative design process in fashion and in the knitwear category specifically?**	**In your opinion, do you think artificial intelligence can facilitate the creative design process in a practical way, now or in the future?**	**Considering the computer-generated knit swatch images presented here and in the survey, if, for example, the digital design programs that you use now had the capability to autonomously generate unlimited "new swatch design options" (varying in stitch, yarn quality, guage, color), which could be developed into the fashion designs, how much do you think this would facilitate the design process in terms of (a) creativity (b) work efficiency (c) marketability?**
6	VP of Production / Product Development at global luxury fashion brand	"not as much"	Interested in using it to address what is seen as key challenge of organization: to design products, from fabric choice to fit, that best meet needs / expectations of customers (as opposed to pleasing the head of company). Currently try to address that challenge with "simple tools...that [help] determine fit or layout or construction", but designers/ creative leads restiance towards virtual/ preference for physical samples is a barrier.	See AI / general digital tools as more realistic to be accepted for repeat basic styles or outlet styles (where less creativity required). Currently digitization relied on more heavily for enginerred print/ embellishment layouts (via CLO, Lectra, Optitex), to maximize production efficiency/yield. For design conception part of process, still rely more heavily on manual / CAD tools to translate manual sketches (not much change since pre-covid)	Can see designers being interested in it as could help add "input to their creative process" with additional knitdown options (in addition to physical samples being requested). But current designer practices still heavily reliant on physical sampling and excessive overdevelopment (e.g. sampled 175 knitdowns, sampled 112 SMS but only adopt 21 for production). Even with the increased transit time to receive samples due to post-covid supply chain distrutions (before built in 3-5 days, now 10days-2 weeks) designers still insistent on physical sample reliance / overdevelopment. Therefore may not have much impact in terms of wastage reduction / sustainability (instead tackling sustainability from a material standpoint). Also dependent on leadership direction preferences towards physical vs. digital. During COVID instead of pivoting to digital reliance, more efforts to enable physical ways of working (e.g. sending mill cards, physical samples to employees homes, alternating groups going to office) thus showing the attatchment to physical ways of working.
7	Production manager at comtemporary DTC lingerie brand	no experience of it in the design and product development process, but can see data science being used to plan business by guage customer demand / preferences to inform decisions	"not so much...we still work in a traditional way. We don't even use like 3D CAD CLO or anything like that. Although some of our vendors do". Other than PLM, a digital tool design uses is "Miro" to create digital fabric/sketch boards (replacing physical pinboards when presenting in meetings but still have small physical fabric cuttings on hand for refernece) and creating a digital fabric library. Also since Covid, suppliers implementing digital asset libraries "where they will scan all their headers and send to us in a a platform and we access through a login".	can see data science as tool to help " better plan the business...to better predict how many units we need, what size and it's things like that..go through returns and reviews and figure out how to better improve our products, but again, we haven't reached that state yet, so those are things that we've hoped to do...". Data scientists are in high demand in fashion - but hard to find.. Could see AI facilitate design by collating customer feedback to help inform their designs Or for merchandising team as tool to facilitate market research / competitive shopping which currently is very "manual".	"the first two steps where you...specify attribute and...get the computer generated digital swatches...that's definitely useful for designer because then they could narrow down the type of fabrics or laces that they want...but in current state I would say he's designers are still very hands on...have to...touch and feel and put things on in order to make a decision...how it's going to feel against the skin...is important for our type of product...So that's where it would be difficult in a digital format.". Instead, can see it being applied in the metaverse. During COVID, shifted to a more virtual way of working - relying on CADs more, virtual fittings, digital fabric reference image via link (instead of physical fabric hangers) .. but was more a bandaid as most things returned to previous physical ways of working after COVID. But as team works remotely from various states, things have been approved off CADs without seeing full sample before.
8	Co-founder & CEO of 3D design software company	understand it is a broad term that encompasses things like machine learning, data, image recognition, and is being used in front end customer engagement, and has potential to be more involved in back end product development	see AI currently being applied to collect data for front end customer engagement, but that information procurement should also be extended to inform back end (e.g. design & product development) decisions. See AI as helping to create a "base" of insights on consumers / trends on which to build a collection/ strategy. Knitting machine manufacturers already developed digital libraries and vertical design systems to help streamline the creative design process. Big movement towards digitizing textile materials (aethetic and physical properties) in last 2-3 years.	beleive that machine learning and data can help build a foundation of digital assets / information that will reduce need to "[redo] everything from scratch". Can provide designers information on their target consumers, a "base" upon which they can create more intentional designs and make more sustainable choices. Seen that whether in enterprise or launching own brand, creative design process consists of 60-70% of "non creative" tedious work (e.g. admin). Think AI role isnt to take away the creative role from designers but can help replace the "non creative" tedious work from the process to give them more time / capacity to be creative: the "machine is not the master of the craft. The craftsman's gonna use the machine or...the automation and artificial artificial intelligence to help them to do their work better". But takes time for designers to "built trust" with digital tools, cannot be a full switch from physical to digital, need balanced transition. Although beleive there is a limitation to rely soley on samples / physical world - dont beleive in eliminating physical samples 100%, but each organization should decide what is best balance of digital integration that works for them.	Believe this is something that is happening already. "What machine learning... or artificial intelligence [can] come in to do is to gather [data]...start proposing, start recommending...start and end...digitizing your methodology". The technology is available but barrier is often that older generations in management passing down traditional ways of working can be resistant to innovation.
9	Knitwear Design Director at high-end fashion label	first time came across the concept was 15yrs ago used in weather prediction to inform designs. Then in next role came across programs being developed with goal to minimize waste / cost in sampling by showing portion of collection or additional colorways/fabrics on an avatar. Aware current companies using it to assist customers online shopping from a fit perspective and fueling prediciton capabilities, relying on customer preorder to determine final buys, and dressing for virtual avatars	Although accustomed to physical ways of working for years (i.e. sketches, boards), now esp post COVID, adopting digital formats when it comes to presenting, documenting, CAD colorways, virtual fittings - see it as more efficient and less wasteful. But "there's something so kind of fun and magical about designing in [the traditional physical way]...that...I shut down a little bit when it becomes too robotic...the process is...most fun for me when there's a team of people and we are discussing and playing. When you take that [physical interaction] away from me...it's not as interesting...I don't think I would find it very fun". Understand the value of AI and digital, but find it difficult to "trust or get excited about" the creative design process without the tactile physical experiences with materials you are designing with, esp as a textile designer background. Also dont think computer can accurately convey the physical / dynamic effects e.g. of adjusting tension/ stitch in a knitted textile.	Come from a traditional design approach background, and acknowledges the generational gap in comfort level towards new technologies, but generally open to learning new technologies so as not to fall behind, though consider barriers to scaled adoption being lack of knowledge and costly investment. But still wary AI will take away the "mystique and magic" of designing and diminish the creative integrity that derives from designers "dig[ging] deep inside themselves...to come up with...ideas that are gonna be well received" by customers, versus a more automated approach of "take a body and plug it in a color and you know don't change fabrics and it's kind of like almost kind of kidding the customer that they're receiving anything creative". But think the applicability of AI depends on a company/brands end goal: whether its to sell more or customer satisfaction or to produce less...	See elements of this concept in existing organization, Tailored Industries in New York, which offers custom knitwear production for non-experts, by specifying basic design elements (e.g. stitch, silhouette, yarn quality, color). See it as an exciting prospect but more suited for mass market / commercial product as still see main issue being the lack of physical tactile experience with textile, which is essential to the creative design process in figuring out appearance / performance. Digital visualizations offered by knit design programs for example, still dont convey the full picture when it comes to dynamic properties of knits.
10	Knitwear Design Director at contemporary mass market fashion brand	"Definitely showing up in many aspects of fashion...in marketing". Think of "fashion designers designing outfits for different types of like avatars" or "Digital fashion like metaverse" but "we don't talk about it at work."	Seen manifest in the shift to digitization of design sketches using CAD software tools (e.g. Adobe Creative suite), factories / technical designers use of CLO to develop patterns, reviewing fits on virtual avatar (applicable for simpler, more commercial product), and video conferencing technologies. Design feels behind in terms of adopting the most innovative AI tools. As an example of leveraging consumer demand / relying on digital interfacing to proceed to production: an on-demand knitwear manufacturer, Tailored Industry in NY, elminiating pre-projected inventory, reducing leadtime and sampling logistics typical for overseas vendors, "To the point where I can tell them I want to create that sweater and...offer it in 15 [stocked] colors...let's say...cashmere sweater in 8 gauge...It takes 3 days for...15 samples [1 per colorway]...because they have the yarn...I fit it...So within a week I have a collection of sweaters...I put them on my...Shopify site...and if a customer buys it...the notification gets pushed to Tailored industry...[they knit the order then] send it straight to the customer in our packaging. So there's no waste"	"Learned a little bit how to work more through digital images [during COVID]...didn't quite make my peace with it. I will always be the person that prefers to touch things and feel it, and I actually don't necessarily love the way that fashion industry is moving into the digital world, but I think the newer generation of people, they don't mind, I think it's gonna create a different product...a lot less sophisticated...less nuances in how things feel, how they look, the gauges, how materials look together because you are looking at things through a digital screen...its gonna create a different product...and i think a future customer wants that kind of product and that's what she's gonna be used to...not only in fashion, it's across all kinds of industries...the product not only has a different look to it, but it also has a different soul to it, like there is just something you can't fake. When you are working digitally, there is so much digital art right now and garments are designed digitally only they're flat and they are on the screen and they're fine. They are nice garments, a lot of them look really good, but [they] look different.". But recognizes the "generational gap where the younger guys have different needs, different likes" in their product choices.	"I find it very helpful when...yarn suppliers show their yarn in variety of stitches...so for me I think this would be helpful and it doesn't need to be like only the digital way of working. It could be mix...like this step and a step where you actually get a [physical] swatch." Would very appreciate the function of computer generating digital swatches, or suggesting yarn options / stitches, based on specified attributes to help knitdown development process by visualizing swatch options before choosing which ones to sample physically. But can't rely on digital rendering of swatch applied to garment as "It's just applying a stitch all over" which is not realistic or exciting.

CHAPTER 5: CONCLUSIONS

5.1 Introduction

The primary purpose of this study was to investigate the potential of deep learning based computational creativity to facilitate the textile design component of the real-world creative fashion design process, in terms of practical utility and creative value. As existing studies manifested a gap towards practical applications of AI towards the creative design function of the fashion & textiles industry, as well as a lack in focus towards the textile component of the fashion design.

In other words, this study encompassed the intersection of 3 key themes: deep learning, knitted textiles, and the creative design process. Each of these 3 themes were interpreted as respective subfields of: Computing (AI), Fashion (Textiles), and Creativity (Creative Practices). Thus, the intersection of these 3 themes represents the gap manifested in existing literature which this study focused on.

In attempt to address this niche gap, this study pursued the three research objectives and respective methodologies as captured below in Table 7:

Table 7: Research Objectives & respective Methodology/Methods summary

Research Objective	Methodology	Method (procedure/tools/sources)
1) Explore systematically the research and methods surrounding the topic of deep learning driven computational creativity for knitted textile design in the fashion creative design process.	Thematic Literature Review	**Academic sources**: e.g. journal publications, conferences **Industry sources**: e.g. news articles, reports, exhibitions
2) Devise a deep learning based computational method that facilitates the knitted textile design component of the knitted fashion creative design process.	Practice-Led	**Digital tools**: Python, Clo3D, Runway ML, Excel, Stoll M1Plus **Physical tools**: Stoll knitting machine, hand knitting loom
3) Evaluate empirically the creative value and practical utility of the devised computational method.	Mixed Method	**Survey**: General Public via online forms platform survey **Interviews**: Fashion industry experts (with real – world experience) through questions / conversation via video conferencing platform

5.2 Summary of Outcomes

The outcomes of the research objectives collectively point to the potential practical utility and creative value which the devised deep learning based computational method could contribute to textile design in the creative fashion design process. To summarize the outcomes of each research objective successively:

1) Research Objective (1), encompassed in the literature review, resulted in a contextual perspective of the intersection between this study's 3 key themes (deep learning, knitted textiles, and the creative design process), which honed in on an apparent research gap in creative fashion design applications of AI that addressed the foundational textile component of fashion design, and not just the outward style, silhouette, color, print elements which has been the predominant focus of existing studies. Another research gap which emerged was a lack of an empirical perspective when it came to evaluating the practical utility or creative value of AI applications towards the actual fashion & textile industry, and especially towards processes not just product creation.
2) Research Objective (2) resulted in an AI driven computational method (based on a deep learning StyleGAN model, with a dataset 2,295 images total, pre-sorted by color and stitch), that was able to generate recognizable knitted textile digital images, with distinguishable physical attributes (such as stitch, gauge and hand-feel), that proved to be sufficient visual reference for factory knitting technicians to interpret into corresponding physical swatch samples.
3) Research Objective (3) results from the evaluative surveys and interviews suggest that the devised AI driven computational method could contribute creative and practical value if adopted as an assistive tool to facilitate knitted textile design in the creative fashion design process. Specifically, the survey results indicate that the AI generated knitted textile images were viewed by participants with the same level of discernment towards the physical and aesthetic attributes as the real ones. Then when projected onto garments, the generated knitted designs were rated overall more creative, fashionable, and buyable than the real ones. The responses from the interviews with fashion industry experts (summarized in Table 8) collectively indicate an openness to AI facilitating the creative fashion design process, but only as an assistive tool to shoulder the non-creative tasks of the design process, such as deciphering data on customer needs and market trends or for providing design inspiration that empowers designers to do their creative tasks more effectively. The interview results also indicate an overriding consensus that the absence of tactility is a

major barrier to embracing any form of digital based tools for knitted textile design, according to the design creatives.

Table 8: Summarized Responses to Interview Questions (of Research Objective 3)

QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4
Describe your understanding of artificial intelligence and its applications in the fashion industry?	**How (have you seen / can you see)* artificial intelligence helping or hindering the creative design process in fashion and in the knitwear category specifically?**	**In your opinion, do you think artificial intelligence can facilitate the creative design process in a practical way, now or in the future?**	**Considering the computer-generated knit swatch images presented here and in the survey…how much do you think this would facilitate the design process in terms of (a) creativity (b) work efficiency (c) marketability?**
UNFAMILIAR | AWARE | FAMILIAR 4 5 1 USER | NON-USER 0 10 DIGITIZATION / CAD / 3D VIRTUAL SOFTWARE | 5 DATA SCIENCE / DATA DRIVEN DEMAND FORECASTING | 5 ALGORITHM DRIVEN MARKETING | 2 VIRTUAL AVATARS / METAVERSE | 3 MACHINE LEARNING | 1 IMAGE RECOGNITION | 1 AUTOMATION | 1 AI DESIGNER | 1	- **NO CURRENT FIRSTHAND EXPERIENCE** - CLOSEST RELATED TECHNOLOGIES MENTIONED: **CAD** TOOLS, **3D VIRTUAL DESIGN** SOFTWARE (CLO, KALEDO, SHIMA APEX) - PREMONINANT USE BY **SUPPLIERS** OR **TECH DESIGN**, NOT CREATIVE DESIGN	- SEE IT SUPPORT IN **NON-CREATIVE TASKS** (E.G. ADMIN, PULLING HISTORY, MARKET RESEARCH, UNDERSTAND CUSTOMER / DEMAND) TO GIVE DESIGNERS MORE CAPACITY TO DO THE CREATIVE TASKS - SEE IT MORE SUITABLE FOR **BASIC STYLES / COMMERCIAL PRICE DRIVEN MASS MARKET** BRANDS WHERE LESS CREATIVITY IS NEEDED (NOT AS SUITED FOR HIGHLY CREATIVE HIGH FASHION COMPANY DRIVEN BY "SEE AND TOUCH") - **PHYSICAL TACTILE/ EMOTIONAL EXPERIENCE** WITH MATERIALS AND IN-PERSON INTERACTIONS STILL HIGHLY VALUED IN CREATIVE DESIGN PROCESS ESP FOR KNITWEAR PRODUCT – EMBODIES A **CREATIVE INTEGRITY** THAT CANNOT BE DIGITALLY MANUFACTURED	- BELIEVE IT CAN **SUPPLEMENT** THE CREATIVE DESIGN PROCESS AS AN **ASSITIVE SUPPORT / DIGITAL REFERENCE** TOOL FOR NICHE SEGMENTS OF THE KNITDOWN DEVELOPMENT PROCESS PROVIDING **E.G. INSPIRATION / VISUALIZATION / ADDITIONAL OPTIONS** - **DIGITAL SUPPLMENT TO PHYSICAL SAMPLES**: MIGHT REDUCE BUT NOT FULLY ELIMINATE PHYSICAL SAMPLING COMPONENT WHICH STILL CAPTURES TACTILE ELEMENTS IRREPLACABLE BY DIGITAL FORMAT - CURRENTLY THE **NEED TO ITERATE** IN THE CREATIVE DESIGN PROCESS IS **GREATER THAN POTENTIAL TIMING & SUTAINABILITY BENEFITS** OF ADOPTING AI TOOLS - POSSIBLE THAT **YOUNGER GENERATIONS** OF DESIGNERS WILL EMBRACE MORE.

5.3 Significance of the Study

The outcomes of this study have both practical and theoretical significance. In terms of practical significance, the results of this study validate that if the devised AI driven computational method was applied in a real-world fashion industry context, it has potential to: (a) augment creativity of designers by providing data-driven textile design inspiration and alleviating non-creative tasks, (b) increase operational efficiency by reducing workload, (c) be digitally compatible for an increasingly digital fashion design process, (d) foster sustainability by reducing waste and sampling needs, (e) reduce development lead-times and costs, (f) inform customer needs and trends by learning from the dataset.

More specifically, a potential practical application, of the devised AI driven computational method (resulting from Research Objective 2), could manifest as a creative virtual "knitdown" generator, which facilitates the swatch or sample design & development in the creative design process for knitwear or knitted textile products, by producing images of knitted textile design options for creative inspiration, based on a specified attribute (e.g. a specific stitch, or color). The procedural framework of this potential application, in the context of the fashion industry's knitwear design & development process, is illustrated in Figure 38 and Figure 39.

Figure 38: Potential practical application of study's devised computational method to facilitate the creative fashion design process (computational framework illustration)

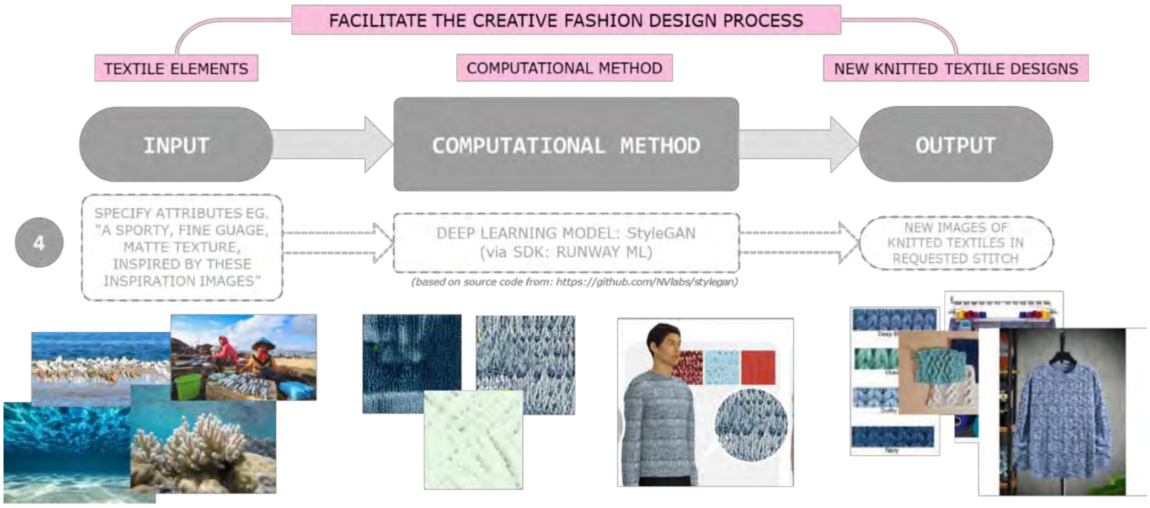
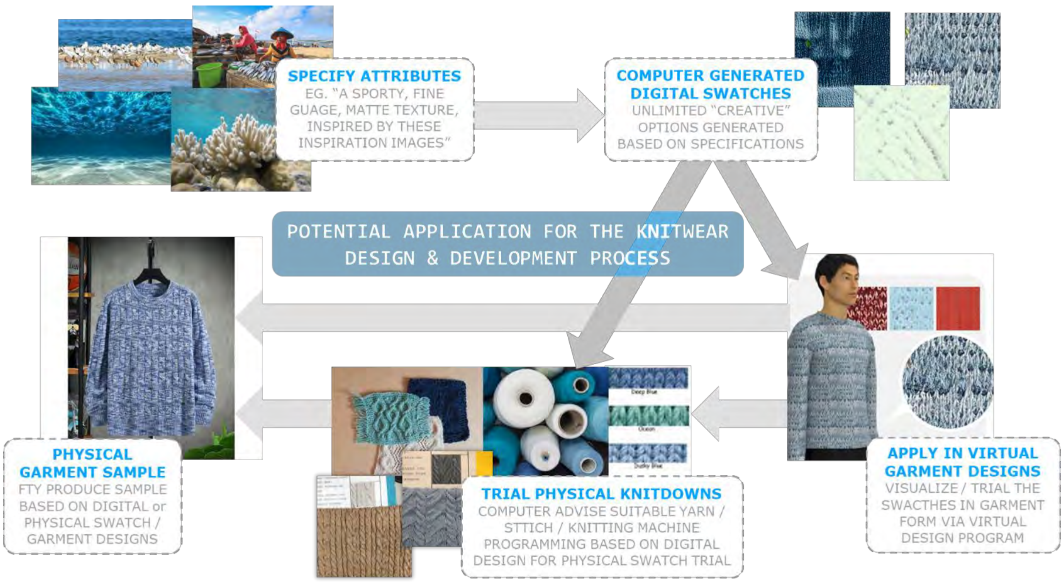


Figure 39: Potential practical application of study's devised computational method to facilitate the creative fashion design process (knitwear design & development process framework illustration)



This potential practical application of deep learning driven computational creativity ultimately benefits the fashion & textiles industry's creative designers, process, and product. First of all, by working towards apply artificial intelligence to the creative fashion design process at a "deeper", more pre-emptive and elemental level of the textile, yarn and someday maybe even the fiber, means enabling data-driven computational algorithms to inform and hone fashion designs in such a way that could ultimately lead to supplying product that more accurately and efficiently meets real-time demand, thereby improving profits and minimizing loss of resources. Secondly, the idea of computationally generated knitted textile "virtual" images (potentially replacing the need to knit physical swatches) is cohesive with fashion design's growing reliance on computational tools (such as CAD, 3D design programs or PDM / PLM data management systems) and the increasing digitization of formerly physical design artefacts (e.g. samples, patterns and sketches), also making it easily transferable onto virtual model renderings for visualizations. Anywhere where virtual can replace the physical, especially in a convolutive and iterative design process such as knitwear's, would help contribute to reducing workload and liability (waste), which is more sustainable.

In terms of theoretical significance, this study presents a novel application of a GAN based deep learning model towards the understudied textile component (specifically, towards the uniquely spatial attributes of knitted textiles) of the fashion creative design process. This study also adopts a novel empirical methodological approach which took into consideration the realities and challenges of the creative fashion design process – differing from most existing studies of creative fashion design AI applications which lacked consideration for real-world relevance. The study also yields theoretical significance in its potential to contribute insight into whether artificial intelligence can exhibit, facilitate, or enhance creativity, and specifically in the nuanced and specialized creative design process of knitwear fashion, which goes deeper than just the visual style elements to involve underlying technical textile attributes. Many existing studies, particularly in the field of Computational Creativity, which have tackled this theoretical enquiry, have demonstrated the potential of artificial intelligence to contribute creatively in fields such as fine art, music, and writing (Abnett, 2016b; M. Boden, 2009; López de Mántaras, 2017; McCormack & D'Inverno, 2012).

5.4 Limitations of the Study

Several key limitations have manifested in each of the study's research objectives.

For Research Objective (1), the literature review was largely based on academic publications procured using an online database search, and therefore the reviewed literature was limited by functionality of the database search engine and its access to literature. Therefore there could have been relevant literature that was not caught in the search results. Furthermore, a great deal of existing research relevant to this study could but conducted outside of the realm of academic publications, and only captured on non-academic media sources, which is challenging to search through in a systematic and comprehensive manner. Furthermore, one of the key challenges, which made it difficult for the literature captured in the review to be fully relevant and up to date, was the fact that this study's key topic (AI) was a rapidly evolving field, therefore a constantly moving target in terms of the latest developments.

For Research Objective (2), the devised AI driven computational method was applied in a few specific ways, and there is a great deal more opportunity to investigate the effects of varying the dataset and the computational model variables. For example, in this study, the dataset was limited to knitted textiles (chosen for its dimensional qualities), therefore it would have been interesting to expand the testing to include, say, woven textiles, to compare and contrast the results. There is also opportunity to further refine the computational model performance by optimizing certain variables, such as the size of the dataset, the data preprocessing technique, the type of model, and the model settings (e.g. number of training epochs, activation function). The training dataset contained a total of 2,295 images, which were then sorted by different knit textile attributes to make smaller training datasets per attribute, therefore expanding the size of the training dataset, as well the number of different classes to sort the dataset by, would also be beneficial. Another apparent limitation is that the output generated by the computational model used (StyleGAN) does not stray far from the learned attributes from dataset, therefore they appear very similar to the dataset and lack novelty. Therefore, there is an opportunity to refine the computational model in a way which increases the novelty factor of the AI generated output.

- refining the computational model variables:
  - model variant (e.g. other GAN variants)
  - model settings (e.g. number of epochs, activation function)
- refining the dataset variables:
  - expanding size and variety of dataset (e.g. over 5000 images and more types of stitches)
  - adjusting format of dataset (e.g. image size)
  - pre-classifying dataset based on different elements of the knitted textile images (e.g. by hand-feel, weight…)

For Research Objective (3), qualitative surveys and interviews were used to evaluate the devised computational method and its output. Therefore there was a lack in quantitative evaluation methods, such as image evaluation metrics (e.g. Frechet Inception Distance (FID) or Inception Score (IS)) to assess the quality of the output AI generated images. The survey method and design could be improved to reduce potential bias. The number of survey questions was relatively limited (in attempt to keep the survey concise so as not to inundate participants), therefore increasing the quantity and variety of questions could have offered further insights into how participants responded to the AI generated images versus the real ones. The real and AI generated knitted textile images in the survey, that were presented as options for the participants to elect from based on certain attributes, varied in color (even though there was an attempt to use swatch images of similar colors in the same question), which poses a risk for bias based on color preference and not purely the generated textile attributes. A more detailed effort should be made to reduce any potentially distracting features in the images. In terms of the interviews, only 10 were conducted and most of the interviewees' experience was US, contemporary or luxury fashion based. Therefore having more interviewees and with a more diverse experience/level could have provided a more comprehensive and substantiated range of responses. Also, in the interview, deriving feedback on the practical and creative implications of the devised computational method was limited to describing it with words and a visual diagram. In order to get more accurate confirmation on the practical and creative implications of the devised computational method, it would be essential to provide and assess first-hand user experience, as well as quantitative impacts (e.g. to leadtime, cost, or material consumption), of implementing the devised computational method in a real-world creative fashion design process context.

5.5 Future opportunities

Based on the aforementioned limitations, future research should investigate the effects of varying the dataset (e.g. in terms of size and content) and the computational model variables. It would be of interest to explore the outcomes of applying the computational method towards other types of textiles beyond knits, and of adjusting the computational model variables that may affect output quality and novelty. But even within the knitted textile context, the derived deep learning based computational method could be further developed to accommodate requests for knitted textile designs based on specified technical attributes (e.g. stitch, gauge, handfeel, ply etc.), as conveyed in Figure 40. This capability could then be further advanced into a potential "AI assistive design tool" which accommodates requests for knitted textile designs based on specified technical attributes (e.g. stitch, gauge, handfeel, ply etc.), in addition to specified aesthetic attributes (e.g. inspiration, theme, mood), as conveyed in Figure 41.

Another important direction of future research, to derive more accurate feedback on the practical and creative implications of the devised deep learning driven computational creativity, is to assess first-hand user experience, as well as quantitative impacts (e.g. to leadtime, cost, or material consumption), of implementing it in a real-world fashion design process context.

Figure 40: Potential future research direction of deep learning based computational method for knitted textile designs based on specified technical attributes

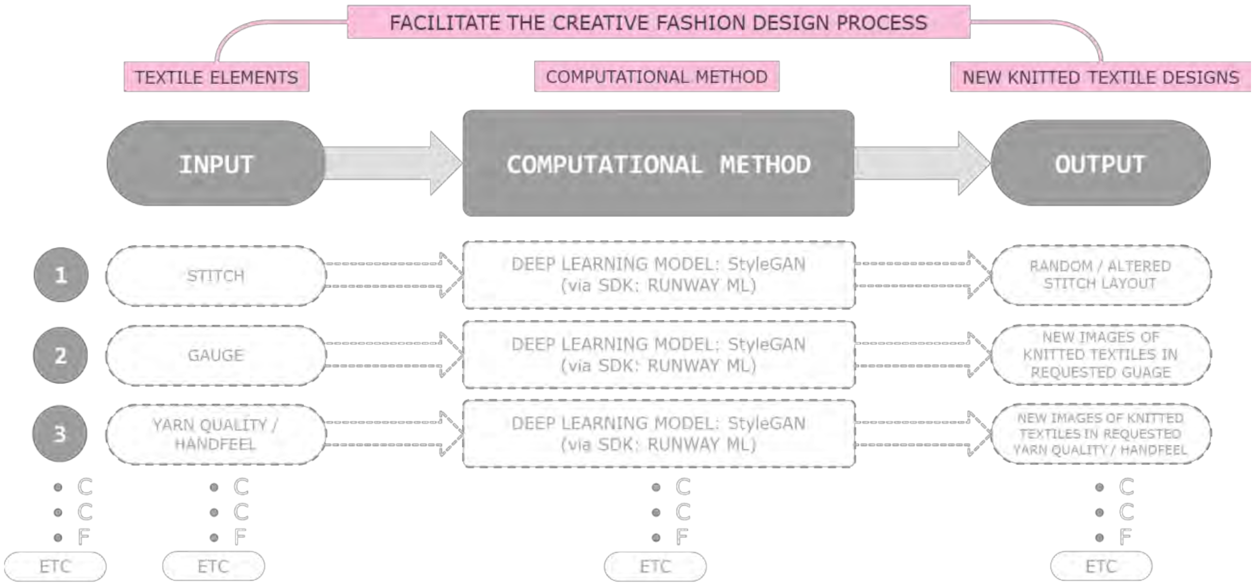
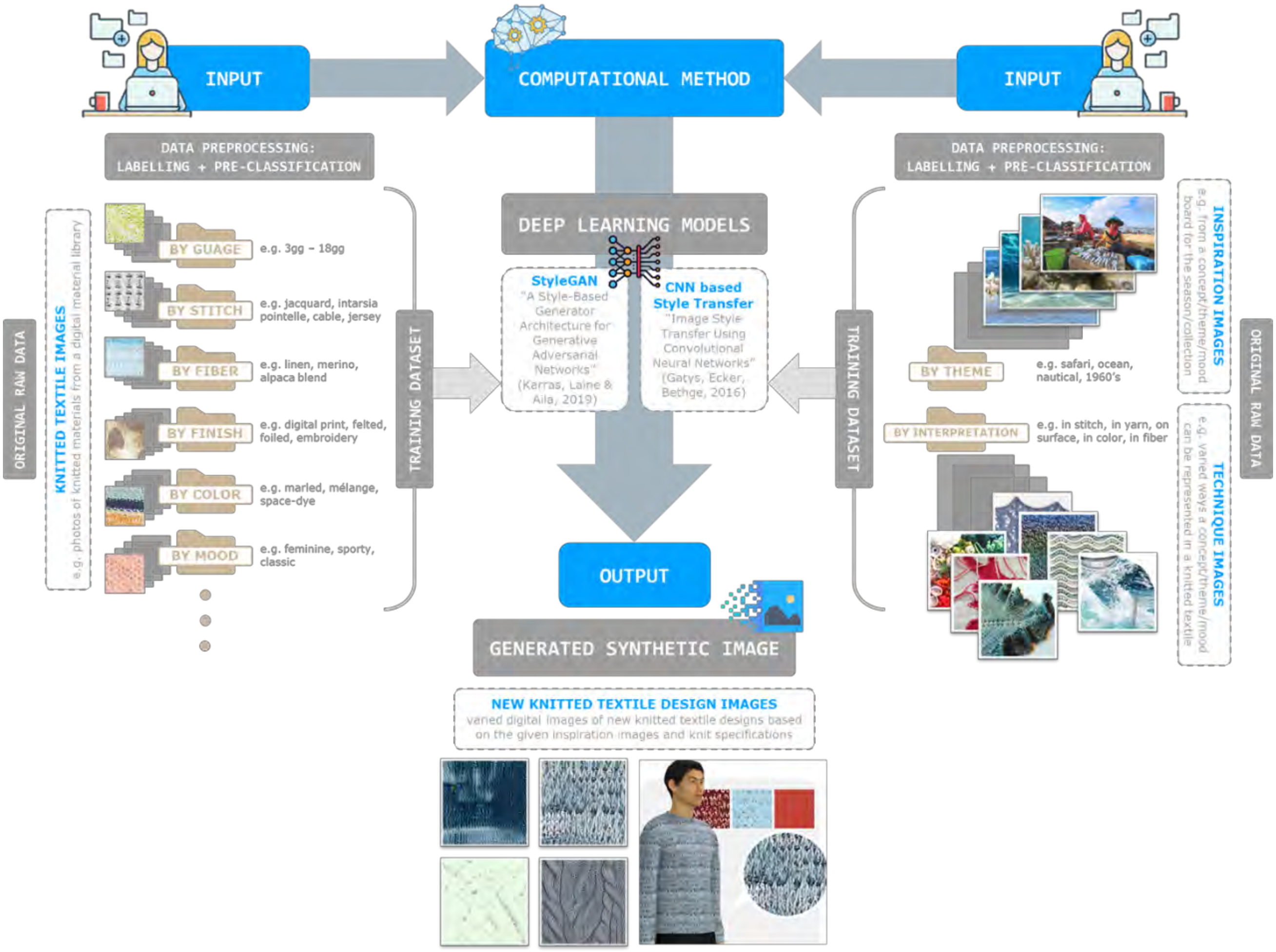


Figure 41: Potential future advancement of deep learning based computational method for knitted textile designs based on specified technical and aesthetic attributes



APPENDICES

Appendix A: Data of Research Objective 3 – Survey Questionnaire Responses

Below is the raw data of the responses from Survey Questionnaire for Research Objective 3, exported from the Google Form automatically generated spreadsheet. Aside from the removal of Name and Email columns, to protect the privacy of participants, the data presented below is in its raw form, without undergoing data scrubbing. Formatting edits, however, were applied to aid visual clarity.

Participant	Timestamp	Gender:	Year of birth:	Current or past Degree Program(s) / Major(s) / Concentration(s), if applicable (e.g. Fashion Marketing, Architecture, Art History....):	Which best describes your hands-on ability in knitting / knitwear design?	Which best describes your understanding of the concepts & theory of knitwear / knitting?	In total, how many years have you been learning or practicing knitting / knitwear design?	Which best describes your interest / passion towards knitwear / knitting?
1	11/26/2020 11:24:47	Female	2000	Fashion design	beginner	not at all	less than 1 year	somewhat
2	11/26/2020 11:26:02	Female	2000	Fashion design	beginner	not at all	less than 1 year	somewhat
3	11/26/2020 11:26:27	Female	1996	Fashion Technology	beginner	limited	less than 1 year	neutral / not sure
4	11/26/2020 11:27:20	Female	1999	Fashion retailing	beginner	moderate	less than 1 year	somewhat
5	11/26/2020 11:27:43	Female	2000	technology	advanced	moderate	less than 1 year	neutral / not sure
6	11/26/2020 11:28:01	Male	2000	Fashion and texiles design	beginner	limited	less than 1 year	somewhat
7	11/26/2020 11:28:38	Female	1996	Fashion Design BA	beginner	limited	1-5 years	somewhat
8	11/26/2020 11:28:40	Female	2000	Fashion and textile design	beginner	moderate	less than 1 year	somewhat
9	11/26/2020 11:35:07	Female	2000		intermediate	moderate	1-5 years	strong
10	11/26/2020 11:40:59	Female	2000	Fashion Design	beginner	limited	less than 1 year	none / very little
11	11/26/2020 12:33:42	Male	1992	Fashion technology	beginner	limited	less than 1 year	neutral / not sure
12	11/26/2020 12:41:02	Female	1996	Fashion design	beginner	limited	less than 1 year	somewhat
13	11/26/2020 12:43:24	Female	1996	Fashion Design BA	beginner	limited	1-5 years	somewhat
14	11/26/2020 12:43:47	Male	1989	Material Engineering	none	limited	less than 1 year	somewhat
15	11/26/2020 12:45:04	Male	1994	Textile Engineering	none	limited	less than 1 year	somewhat
16	11/26/2020 12:46:16	Female	1998	Fashion Design	intermediate	moderate	1-5 years	somewhat
17	11/26/2020 12:52:22	Male	1996	Fashion and textile techonology	none	limited	less than 1 year	neutral / not sure
18	11/26/2020 12:52:33	Female	1998	Fashion and textile technology	intermediate	moderate	1-5 years	neutral / not sure
19	11/26/2020 12:55:45	Female	UNSPECIFIED		advanced	moderate	1-5 years	somewhat
20	11/26/2020 13:01:49	Female	UNSPECIFIED		beginner	moderate	1-5 years	somewhat
21	11/26/2020 13:11:42	Female	1995	Fashion Design	intermediate	limited	1-5 years	somewhat
22	11/26/2020 20:35:22	Female	1988		none	not at all	less than 1 year	none / very little
23	11/26/2020 23:18:07	Female	1986	Landscape	none	not at all	less than 1 year	somewhat
24	12/14/2020 2:50:54	Female	2000	Degree, design	beginner	limited	less than 1 year	somewhat
25	12/14/2020 16:50:04	Male	UNSPECIFIED	fashion retail	none	limited	less than 1 year	neutral / not sure
26	12/14/2020 17:08:55	Female	2001	Fashion design	beginner	limited	less than 1 year	somewhat
27	12/14/2020 17:56:50	Male	1997	Fashion Technology	intermediate	moderate	less than 1 year	somewhat
28	12/14/2020 19:20:05	Female	2000	Fashion and Textiles	beginner	limited	less than 1 year	strong
29	12/14/2020 19:25:32	Female	UNSPECIFIED	Fashion marketing	none	moderate	less than 1 year	neutral / not sure
30	12/14/2020 23:38:58	Female	2000	Fashion Retail and marketing	beginner	moderate	less than 1 year	neutral / not sure
31	12/14/2020 23:41:48	Female	2000	BA Fashion Design (retail and marketing)	beginner	moderate	less than 1 year	neutral / not sure
32	12/15/2020 1:13:50	Female	1999	knitwear design	beginner	limited	less than 1 year	strong
33	12/15/2020 10:10:34	Female	2001	Fashion Technology	beginner	limited	less than 1 year	none / very little
34	12/15/2020 10:25:32	Female	2001	Fashion Design	beginner	limited	less than 1 year	neutral / not sure
35	12/15/2020 11:34:36	Female	2000	Fashion Marketing	beginner	not at all	less than 1 year	somewhat
36	12/15/2020 11:45:49	Male	2001	Fashion and textiles	beginner	not at all	less than 1 year	neutral / not sure
37	12/15/2020 23:31:30	Female	2000	Fashion Marketing	none	not at all	less than 1 year	none / very little
38	12/17/2020 3:55:47	Female	2001	Fashion design	beginner	limited	less than 1 year	somewhat
39	12/18/2020 12:11:38	Female	2001		beginner	limited	less than 1 year	somewhat
40	12/18/2020 15:41:44	Female	2001	Knitwear design and technology	beginner	limited	less than 1 year	neutral / not sure
41	12/23/2020 21:54:04	Male	2000	PolyU Fashion Marketing (year3)	beginner	limited	less than 1 year	neutral / not sure
42	12/25/2020 18:25:36	refer not to sa	1993	Civil Eng.	none	limited	less than 1 year	none / very little
43	10/26/2021 10:30:06	Male	2001	fashion market	beginner	moderate	less than 1 year	somewhat
44	10/26/2021 10:30:23	Female	UNSPECIFIED	Retail & Marketing	beginner	limited	less than 1 year	neutral / not sure
45	10/26/2021 10:31:17	Female	1999		beginner	limited	less than 1 year	somewhat
46	10/26/2021 10:31:26	Female	2001	Fashion design (itc)	beginner	limited	less than 1 year	somewhat
47	10/26/2021 10:31:52	Female	1999	fashion and Textile (specialism: Intimate Apparel)	none	limited	less than 1 year	neutral / not sure
48	10/26/2021 10:32:06	Male	2000	accounting	beginner	limited	less than 1 year	none / very little
49	10/26/2021 10:32:27	Female	2000	Retail and Marketing	beginner	not at all	less than 1 year	neutral / not sure
50	10/26/2021 10:33:53	Female	UNSPECIFIED		beginner	limited	less than 1 year	somewhat
51	10/26/2021 10:34:03	Female	2002	BAs in Scheme of textile and clothings - design	beginner	limited	less than 1 year	neutral / not sure
52	10/26/2021 10:34:23	Female	2000	Fashion Marketing	beginner	limited	less than 1 year	somewhat
53	10/26/2021 10:35:02	Male	2000	Bachelor of Arts (Honours) Scheme in Fashion and Texti	none	limited	less than 1 year	neutral / not sure
54	10/26/2021 10:36:27	Female	2000	Past: Chinese studies	beginner	moderate	less than 1 year	neutral / not sure
55	10/26/2021 10:37:10	Female	2002	fashion&textile	none	limited	less than 1 year	strong
56	10/26/2021 10:39:01	Female	2002	Intimate and active wear	none	not at all	less than 1 year	somewhat
57	10/26/2021 10:44:17	Female	2002		beginner	limited	less than 1 year	somewhat
58	10/26/2021 10:44:40	Female	2002	Fashion Marketing	none	not at all	less than 1 year	somewhat
59	10/26/2021 10:52:56	Female	2002	ITC	beginner	limited	less than 1 year	somewhat
60	10/27/2021 15:08:27	Male	1999	Fashion Technology	none	limited	less than 1 year	somewhat
61	10/27/2021 15:09:57	Male	2002	Fashion and textile	beginner	moderate	less than 1 year	neutral / not sure
62	10/27/2021 15:09:57	Female	2002	Fashion design	beginner	limited	less than 1 year	neutral / not sure
63	10/27/2021 15:10:53	Female	2002	Itc	beginner	limited	1-5 years	somewhat
64	10/27/2021 15:12:09	Female	2002	Scheme in Fashion and textiles	none	limited	less than 1 year	none / very little
65	10/27/2021 15:12:09	Male	2000	ITC	none	not at all	less than 1 year	none / very little
66	10/27/2021 15:12:41	Female	2002	BA Fashion Design	intermediate	limited	1-5 years	somewhat
67	10/27/2021 15:12:56	Female	2002	fashion design	beginner	moderate	1-5 years	somewhat
68	10/27/2021 15:13:12	Female	2002	Major in Fashion and Textiles	beginner	limited	less than 1 year	somewhat
69	10/27/2021 15:14:24	Female	1997	Currently Y2 ITC-IAA	beginner	limited	less than 1 year	neutral / not sure
70	10/27/2021 15:14:32	Female	2000	fashion and textile	none	limited	less than 1 year	none / very little

Participant	Timestamp	Gender:	Year of birth:	Current or past Degree Program(s) / Major(s) / Concentration(s), if applicable (e.g. Fashion Marketing, Architecture, Art History....):	Which best describes your hands-on ability in knitting / knitwear design?	Which best describes your understanding of the concepts & theory of knitwear / knitting?	In total, how many years have you been learning or practicing knitting / knitwear design?	Which best describes your interest / passion towards knitwear / knitting?
71	10/28/2021 5:33:44	Female	2000	fashion marketing	none	not at all	less than 1 year	none / very little
72	10/28/2021 10:14:24	Male	2001		none	not at all	less than 1 year	neutral / not sure
73	10/28/2021 10:16:43	Male	2001	Fashion Marketing	beginner	limited	less than 1 year	somewhat
74	10/28/2021 10:24:29	Female	UNSPECIFIED		beginner	limited	less than 1 year	neutral / not sure
75	10/28/2021 10:25:20	Male	2000	BA (HONS) FASHION & TEXTILES (RETAIL & MARKET	beginner	limited	less than 1 year	neutral / not sure
76	10/28/2021 10:59:57	Female	2000	ITC	beginner	moderate	less than 1 year	somewhat
77	10/28/2021 11:00:29	Female	1998	Retail & Marketing	none	not at all	less than 1 year	somewhat
78	10/28/2021 11:01:32	Female	2001	Fashion marketing	beginner	moderate	less than 1 year	neutral / not sure
79	10/28/2021 11:03:37	Female	2000	retail and marketing	none	not at all	less than 1 year	neutral / not sure
80	10/28/2021 11:04:17	Female	2001		none	not at all	less than 1 year	neutral / not sure
81	10/28/2021 11:04:18	Male	2001	Fashion Marketing	beginner	limited	less than 1 year	none / very little
82	10/28/2021 11:04:35	Female	2000	Fashion marketing	beginner	limited	less than 1 year	somewhat
83	10/28/2021 11:06:05	Female	2001	Retailing and marketing	beginner	limited	less than 1 year	somewhat
84	10/28/2021 11:07:31	Female	2001	ITC	beginner	limited	less than 1 year	neutral / not sure
85	10/28/2021 11:19:08	Female	UNSPECIFIED	BA (HONS) FASHION & TEXTILES (RETAIL & MARKETI	beginner	not at all	less than 1 year	neutral / not sure
86	10/28/2021 16:06:17	Female	2001	Fashion design	beginner	moderate	less than 1 year	neutral / not sure
87	10/28/2021 16:14:00	Female	2002	Fashion	none	limited	less than 1 year	neutral / not sure
88	10/28/2021 17:36:10	Female	2002	Fashion Design	none	limited	less than 1 year	somewhat
89	10/28/2021 17:36:23	Female	2001	fashion design degree	beginner	limited	less than 1 year	none / very little
90	10/28/2021 20:15:57	Female	2001	Fashion and Textiles (Retail and Marketing)	none	limited	less than 1 year	none / very little
91	10/28/2021 20:44:38	Male	2001	itc (tech)	none	not at all	less than 1 year	somewhat
92	10/28/2021 21:22:46	Male	2001	Fashion and Textile	beginner	moderate	less than 1 year	somewhat
93	10/28/2021 21:39:44	Male	2001	Fashion and textiles(technology)	none	limited	less than 1 year	none / very little
94	10/28/2021 22:57:36	Female	2001		none	limited	less than 1 year	somewhat
95	2/10/2022 11:44:23	Female	2001	Digital media	none	not at all	less than 1 year	none / very little
96	2/10/2022 11:44:59	Female	2000	Engl	beginner	limited	less than 1 year	somewhat
97	2/10/2022 11:45:10	Male	2000	Accounting and finance	intermediate	limited	less than 1 year	neutral / not sure
98	2/10/2022 11:45:18	Male	2002	Marketing	none	not at all	less than 1 year	neutral / not sure
99	2/10/2022 11:45:48	Female	2001	Marketing	beginner	limited	less than 1 year	none / very little
100	2/10/2022 11:46:02	Female	1999	English	none	limited	less than 1 year	none / very little
101	2/10/2022 11:46:37	Female	UNSPECIFIED	EIE	none	not at all	less than 1 year	none / very little
102	2/10/2022 11:47:02	Female	2000	English	none	limited	less than 1 year	neutral / not sure
103	2/10/2022 11:47:10	Male	2003	Hotel&tourism management	beginner	limited	less than 1 year	neutral / not sure
104	2/10/2022 11:47:10	Female	2002	BBA Management	none	limited	less than 1 year	neutral / not sure
105	2/10/2022 11:47:13	Male	2000	Computing	none	not at all	less than 1 year	neutral / not sure
106	2/10/2022 11:47:15	Female	2001	Digital fashion	none	limited	less than 1 year	neutral / not sure
107	2/10/2022 11:47:20	Male	2001	accounting	none	limited	less than 1 year	none / very little
108	2/10/2022 11:47:22	Male	2002	Financial Services	none	limited	less than 1 year	somewhat
109	2/10/2022 11:47:25	Female	2002	Department of English	none	not at all	less than 1 year	neutral / not sure
110	2/10/2022 11:47:37	Female	2002	MM	beginner	limited	less than 1 year	neutral / not sure
111	2/10/2022 11:48:05	Male	2002	ENGINEERING	beginner	limited	less than 1 year	none / very little
112	2/10/2022 11:49:57	Female	2001	Marketing	none	not at all	less than 1 year	neutral / not sure
113	2/10/2022 11:54:14	Male	2002	Accounting and Finance	beginner	not at all	less than 1 year	neutral / not sure
114	2/10/2022 16:36:18	Female	1991	MA Material Futures	beginner	moderate	1-5 years	strong
115	2/10/2022 20:31:33	Female	1981	Design and merchandising- production concentration	intermediate	limited	10+ years	neutral / not sure
116	2/10/2022 20:53:08	Female	1972	BA International Relations; MBA	none	limited	less than 1 year	none / very little
117	2/10/2022 21:32:45	Female	1986	MBA (completed)	none	limited	less than 1 year	somewhat
118	2/10/2022 22:41:11	Female	1963		intermediate	moderate	less than 1 year	strong
119	2/10/2022 22:41:02	Female	1994	BFA Studio Arts	beginner	limited	less than 1 year	strong
120	2/10/2022 22:57:41	Female	1998	English Language and Literature	none	limited	less than 1 year	neutral / not sure
121	2/10/2022 23:22:01	Female	1990	BFA Fashion Design	advanced	comprehensive	10+ years	strong
122	2/11/2022 1:06:30	Female	UNSPECIFIED		none	limited	less than 1 year	none / very little
123	2/11/2022 3:14:23	Female	UNSPECIFIED	Fashion design / international trade and marketing	beginner	comprehensive	10+ years	strong
124	2/11/2022 4:36:35	Female	1985	None applicable	beginner	not at all	less than 1 year	somewhat
125	2/11/2022 15:29:11	Female	2001	Design	none	not at all	less than 1 year	neutral / not sure
126	2/11/2022 15:29:24	Female	2000	Fashion and textiles in Intimate Apparel and Activewear	beginner	limited	1-5 years	neutral / not sure
127	2/11/2022 15:31:47	Female	1997	ITC Fashion design	beginner	limited	less than 1 year	strong
128	2/11/2022 15:40:40	Female	2003	Associate degree in fashion design	beginner	limited	less than 1 year	somewhat
129	2/11/2022 15:51:57	Female	2001	Fashion design	beginner	moderate	less than 1 year	somewhat
130	2/11/2022 16:46:35	Female	1998	Fashion Design	beginner	limited	less than 1 year	none / very little
131	2/11/2022 17:00:52	Female	1999	Fashion Design	beginner	limited	less than 1 year	none / very little
132	2/11/2022 17:13:15	Female	UNSPECIFIED		beginner	limited	less than 1 year	somewhat
133	2/11/2022 17:30:10	Female	2002	Fashion Design	none	not at all	less than 1 year	somewhat
134	2/11/2022 17:35:12	Female	UNSPECIFIED		beginner	limited	less than 1 year	somewhat
135	2/11/2022 17:51:38	Female	2002	Fashion design	beginner	limited	less than 1 year	none / very little
136	2/11/2022 18:31:43	Female	1996	Knitwear Design(ITC)	intermediate	moderate	1-5 years	somewhat
137	2/11/2022 20:44:58	Female	UNSPECIFIED		beginner	limited	less than 1 year	somewhat
138	2/11/2022 23:08:47	Female	1987	BA Psychology, MS Marriage and Family Therapy	beginner	limited	less than 1 year	somewhat
139	2/11/2022 23:57:25	Female	1996	English Language and Linguistics; Education	none	not at all	less than 1 year	none / very little
140	2/12/2022 1:12:53	Female	1993	Fashion design	intermediate	moderate	1-5 years	strong

Participant	Timestamp	Gender:	Year of birth:	Current or past Degree Program(s) / Major(s) / Concentration(s), if applicable (e.g. Fashion Marketing, Architecture, Art History....):	Which best describes your hands-on ability in knitting / knitwear design?	Which best describes your understanding of the concepts & theory of knitwear / knitting?	In total, how many years have you been learning or practicing knitting / knitwear design?	Which best describes your interest / passion towards knitwear / knitting?
141	2/12/2022 10:27:23	Female	UNSPECIFIED		beginner	moderate	less than 1 year	strong
142	2/12/2022 10:55:21	Female	1997	Intimate Apparel and Activewear	beginner	limited	1-5 years	neutral / not sure
143	2/12/2022 12:11:59	Female	2001	Itc	beginner	limited	less than 1 year	neutral / not sure
144	2/12/2022 12:55:10	Male	2001	Fashion design	beginner	limited	less than 1 year	none / very little
145	2/12/2022 14:15:06	Female	1960	Master in social work	none	limited	less than 1 year	neutral / not sure
146	2/12/2022 15:38:43	Female	UNSPECIFIED	Building construction	intermediate	comprehensive	1-5 years	strong
147	2/12/2022 16:09:48	Female	1998	Fashion design	beginner	limited	less than 1 year	neutral / not sure
148	2/12/2022 19:49:00	Female	UNSPECIFIED	Fashion design	beginner	limited	less than 1 year	neutral / not sure
149	2/12/2022 22:47:07	Female	1995	Fashion design and management	intermediate	comprehensive	1-5 years	strong
150	2/13/2022 2:32:49	Female	2002	Fashion Technology	beginner	limited	less than 1 year	somewhat
151	2/13/2022 13:06:49	Male	1959	Food science	none	not at all	less than 1 year	neutral / not sure
152	2/13/2022 22:17:16	Female	2002	Fashion design	none	limited	less than 1 year	neutral / not sure
153	2/14/2022 9:37:28	Female	2002	BA (HONS) FASHION & TEXTILES (DESIGN)	beginner	limited	less than 1 year	somewhat
154	2/14/2022 10:25:03	Female	2001	ITC-Design	none	limited	less than 1 year	somewhat
155	2/14/2022 15:31:18	Male	1988	MS in Finance	none	not at all	less than 1 year	none / very little
156	2/15/2022 9:32:16	Female	1986	BA in English	none	not at all	less than 1 year	none / very little
157	2/17/2022 19:59:23	Female	1999	Hotel Management Bachelor Degree	beginner	not at all	less than 1 year	somewhat
158	2/17/2022 20:02:09	Female	1994	Finance	none	limited	less than 1 year	none / very little
159	2/17/2022 20:09:34	Female	1989	Academic literacy	none	limited	less than 1 year	neutral / not sure
160	2/17/2022 20:56:39	Female	1992	Construction Management	beginner	not at all	less than 1 year	neutral / not sure
161	2/17/2022 21:23:00	Female	1999	Food safety and technology	none	not at all	less than 1 year	neutral / not sure
162	2/17/2022 21:32:35	Male	1998	Civil Engineering	none	limited	less than 1 year	none / very little
163	2/17/2022 22:29:21	Male	1999	Electrical engineering	none	not at all	less than 1 year	none / very little
164	2/17/2022 22:30:09	Male	2001	Computing	beginner	limited	less than 1 year	neutral / not sure
165	2/18/2022 4:22:46	Female	1985	BA in Fashion merchandise and marketing	intermediate	moderate	10+ years	somewhat
166	2/18/2022 10:36:58	Female	2000	Industrial engineering	beginner	limited	less than 1 year	somewhat
167	2/19/2022 1:33:59	Female	UNSPECIFIED		beginner	limited	1-5 years	neutral / not sure
168	2/19/2022 12:01:18	Female	2000	Management	intermediate	moderate	less than 1 year	somewhat
169	2/20/2022 17:26:44	Female	2001	Fashion design	beginner	limited	less than 1 year	somewhat
170	2/21/2022 10:49:21	Female	1998	HD Fashion Image Design	beginner	limited	less than 1 year	neutral / not sure
171	2/24/2022 11:18:41	Female	UNSPECIFIED	Fashion product developers	intermediate	comprehensive	10+ years	somewhat
172	2/24/2022 23:40:38	Female	1962	English Lit	intermediate	moderate	10+ years	strong
173	2/26/2022 21:30:45	Male	1994	PhD in building safety	none	not at all	less than 1 year	none / very little
174	2/26/2022 22:48:43	Female	1992	Food Science and Technology	none	limited	less than 1 year	none / very little
175	2/26/2022 22:49:01	Female	1998	biochemistry	none	limited	less than 1 year	none / very little
176	2/26/2022 22:58:26	Male	UNSPECIFIED	chemical	beginner	limited	less than 1 year	none / very little
177	2/26/2022 23:00:16	Female	UNSPECIFIED		intermediate	limited	less than 1 year	neutral / not sure
178	2/26/2022 23:59:07	Female	1992	Fashion Design	advanced	comprehensive	6-10 years	strong
179	2/27/2022 12:02:25	Female	1995	Environmental studies	beginner	limited	less than 1 year	somewhat
180	2/27/2022 19:38:10	Female	1983		none	not at all	less than 1 year	neutral / not sure
181	2/27/2022 19:51:14	Female	1981	Food and nutritional sciences	none	limited	less than 1 year	somewhat
182	2/27/2022 21:05:54	Female	2003	Environmental Engineering	none	limited	less than 1 year	neutral / not sure
183	2/27/2022 21:17:35	Male	2002	Biology	none	not at all	less than 1 year	none / very little
184	2/27/2022 21:27:52	Female	1993	Applied Physics	beginner	limited	less than 1 year	somewhat
185	2/27/2022 21:39:12	Female	1999	Japanese、teaching Chinese as second language	none	limited	less than 1 year	neutral / not sure
186	2/27/2022 22:22:30	Female	1980	Biotechnology	beginner	not at all	less than 1 year	none / very little
187	2/27/2022 22:24:03	Female	2002	BSc geology	none	limited	less than 1 year	somewhat
188	2/27/2022 22:24:39	Male	1967	Chemistry	none	limited	less than 1 year	none / very little
189	2/27/2022 23:49:10	Female	2003	Accountancy	beginner	limited	1-5 years	somewhat
190	2/28/2022 0:30:27	Female	UNSPECIFIED		beginner	limited	less than 1 year	none / very little
191	2/28/2022 9:00:34	Female	1990	Science	none	not at all	less than 1 year	none / very little
192	2/28/2022 18:34:37	Female	1990	Biology	beginner	not at all	less than 1 year	neutral / not sure
193	2/28/2022 19:18:46	Female	UNSPECIFIED		beginner	limited	less than 1 year	somewhat
194	2/28/2022 19:32:53	Male	UNSPECIFIED		intermediate	moderate	6-10 years	neutral / not sure
195	2/28/2022 22:53:04	Male	1998	Biomedical Engineering + Applied Mathematics	beginner	limited	less than 1 year	somewhat
196	2/28/2022 23:09:19	Female	1992	chemistry	none	limited	less than 1 year	neutral / not sure
197	3/1/2022 3:17:41	Female	1995	Bachelor of Sciences in Fashion merchandising	beginner	moderate	1-5 years	somewhat
198	3/1/2022 12:33:02	Female	1965	BSN	none	not at all	less than 1 year	neutral / not sure
199	3/1/2022 14:39:58	Male	UNSPECIFIED	Chemical engineering	none	limited	less than 1 year	none / very little
200	3/1/2022 22:24:11	Female	1987	Chemical Engineering	none	not at all	less than 1 year	somewhat
201	3/2/2022 5:46:49	Female	1993	Chemical Biology	beginner	limited	less than 1 year	somewhat
202	3/2/2022 21:50:46	Female	2001	accounting	intermediate	moderate	1-5 years	none / very little
203	3/4/2022 0:45:13	Female	1965		intermediate	comprehensive	6-10 years	somewhat
204	3/6/2022 17:05:29	Female	UNSPECIFIED		none	limited	less than 1 year	none / very little
205	3/10/2022 8:35:07	Male	1958	Bachelor of Science	beginner	limited	1-5 years	none / very little
206	4/6/2022 23:30:17	Male	1987	BS: Fiber Science and Apparel Design; MS: Business fo	intermediate	comprehensive	6-10 years	strong
207	4/6/2022 23:49:01	Female	UNSPECIFIED	Fashion Design	intermediate	moderate	10+ years	strong
208	4/9/2022 0:23:22	Female	1980	BA fashion design	advanced	comprehensive	10+ years	strong
209	4/11/2022 13:13:23	Female	1985	Theater	none	limited	less than 1 year	somewhat
210	4/14/2022 5:13:05	Female	1968	English Literature, BA; Fashion Design AA	advanced	comprehensive	10+ years	strong
211	4/19/2022 21:42:22	Female	1975	Ba knitwear design	advanced	comprehensive	10+ years	strong

	QUESTION 1: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed descriptions:						QUESTION 2: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
Participant	CLASSIC	OLD FASHIONED	SPORTY	FEMININE	ELEGANT	MODERN	MOST CREATIVE / INTERESTING	MOST FASHIONABLE / STYLISH	MOST LIKELY TO BUY A SWEATER IN THIS	LEAST CREATIVE / INTERESTING	LEAST FASHIONABLE / STYLISH	LEAST LIKELY TO BUY A SWEATER IN THIS
1	Swatch 3	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 4
2	Swatch 3	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 4
3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 2
4	Swatch 2	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 3
5	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 2
6	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 1
7	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 2
8	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 2
9	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1
10	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 1
11	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4	Swatch 3	Swatch 4
12	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 2	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 3
13	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 2
14	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 2
15	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 3	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 1
16	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2
17	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 4
18	Swatch 1	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 2
19	Swatch 3	Swatch 2	Swatch 4	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2
20	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 3	Swatch 3	Swatch 3
21	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 2
22	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 2
23	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 3
24	Swatch 1	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 4	Swatch 3
25	Swatch 3	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 1
26	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 1
27	Swatch 2	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 2
28	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 4
29	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 1
30	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 2	Swatch 2
31	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 4
32	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 4
33	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 2
34	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 4
35	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 3
36	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2
37	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2
38	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 1
39	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 2
40	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1
41	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 2
42	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 1	Swatch 1
43	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 3
44	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 1
45	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2
46	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 1
47	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 2
48	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 3
49	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 2
50	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2
51	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 1
52	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 2
53	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 3	Swatch 2
54	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1
55	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2
56	Swatch 3	Swatch 3	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 4
57	Swatch 2	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 2
58	Swatch 3	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 4
59	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 1
60	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 1
61	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 2
62	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 2	Swatch 3	Swatch 2
63	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1
64	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 3
65	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 2
66	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2
67	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 4
68	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 4
69	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 2
70	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2

Participant	QUESTION 3: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					QUESTION 4: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:						QUESTION 5: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
	MOST SOFT	MOST SHINY	MOST FLUFFY	LEAST THICK	LEAST SMOOTH	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE
1	Swatch A	Swatch C	Swatch B	Swatch D	Swatch C	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 3	Sweater 3	Sweater B	Sweater A	Sweater A	Sweater C	Sweater D	Sweater D
2	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater D	Sweater C	Sweater A	Sweater C
3	Swatch A	Swatch C	Swatch B	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
4	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 3	Sweater 3	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A
5	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 1	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater A
6	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
7	Swatch B	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 1	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater A	Sweater B	Sweater D	Sweater B	Sweater D	Sweater C
8	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 2	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater D	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
9	Swatch C	Swatch C	Swatch A	Swatch A	Swatch B	Sweater 2	Sweater 4	Sweater 3	Sweater 2	Sweater 1	Sweater 3	Sweater B	Sweater C	Sweater D	Sweater A	Sweater C	Sweater B
10	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater C	Sweater B	Sweater D	Sweater B	Sweater C	Sweater C
11	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater B	Sweater C	Sweater A	Sweater C	Sweater C
12	Swatch B	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 3	Sweater 4	Sweater 3	Sweater 2	Sweater 2	Sweater 3	Sweater B	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A
13	Swatch B	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 1	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater A	Sweater B	Sweater D	Sweater B	Sweater D	Sweater C
14	Swatch A	Swatch C	Swatch A	Swatch B	Swatch C	Sweater 1	Sweater 2	Sweater 4	Sweater 3	Sweater 1	Sweater 2	Sweater C	Sweater A	Sweater C	Sweater B	Sweater B	Sweater B
15	Swatch D	Swatch C	Swatch A	Swatch B	Swatch C	Sweater 3	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater C	Sweater C	Sweater B	Sweater A	Sweater B
16	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater B	Sweater D	Sweater D	Sweater C	Sweater C	Sweater A
17	Swatch A	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater B	Sweater B	Sweater C	Sweater A	Sweater A
18	Swatch A	Swatch C	Swatch B	Swatch C	Swatch D	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 1	Sweater B	Sweater A	Sweater A	Sweater B	Sweater C	Sweater B
19	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 3	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater D	Sweater D	Sweater C	Sweater B	Sweater C
20	Swatch A	Swatch C	Swatch A	Swatch C	Swatch C	Sweater 1	Sweater 1	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A
21	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 1	Sweater 2	Sweater 4	Sweater 2	Sweater 3	Sweater 2	Sweater C	Sweater D	Sweater A	Sweater C	Sweater C	Sweater B
22	Swatch C	Swatch C	Swatch B	Swatch C	Swatch A	Sweater 4	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater B	Sweater B	Sweater B
23	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 3	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater 3	Sweater D	Sweater B	Sweater A	Sweater C	Sweater D	Sweater D
24	Swatch A	Swatch C	Swatch B	Swatch B	Swatch C	Sweater 3	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater C	Sweater D	Sweater A	Sweater A	Sweater C
25	Swatch C	Swatch D	Swatch A	Swatch B	Swatch D	Sweater 2	Sweater 1	Sweater 1	Sweater 1	Sweater 2	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A	Sweater C
26	Swatch B	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater 2	Sweater D	Sweater A	Sweater A	Sweater C	Sweater C	Sweater D
27	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater D	Sweater B	Sweater C	Sweater C	Sweater C
28	Swatch A	Swatch C	Swatch B	Swatch B	Swatch D	Sweater 2	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 3	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
29	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 2	Sweater 4	Sweater B	Sweater A	Sweater A	Sweater D	Sweater D	Sweater C
30	Swatch A	Swatch B	Swatch C	Swatch B	Swatch D	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 2	Sweater B	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A
31	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 3	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater C
32	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater C	Sweater C	Sweater D	Sweater D	Sweater D
33	Swatch B	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater D	Sweater B	Sweater A	Sweater D	Sweater C	Sweater C
34	Swatch A	Swatch C	Swatch A	Swatch D	Swatch A	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 2	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
35	Swatch A	Swatch C	Swatch B	Swatch C	Swatch D	Sweater 2	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 3	Sweater A	Sweater A	Sweater C	Sweater B	Sweater B	Sweater B
36	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater C	Sweater B	Sweater D	Sweater A	Sweater C
37	Swatch A	Swatch C	Swatch D	Swatch B	Swatch B	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 1	Sweater 2	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
38	Swatch B	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater 2	Sweater D	Sweater A	Sweater A	Sweater C	Sweater C	Sweater D
39	Swatch D	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater A	Sweater A	Sweater C	Sweater C	Sweater B
40	Swatch A	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 1	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 3	Sweater C	Sweater A	Sweater A	Sweater B	Sweater D	Sweater B
41	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 4	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
42	Swatch B	Swatch C	Swatch A	Swatch D	Swatch A	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater D	Sweater A	Sweater A	Sweater B	Sweater C	Sweater C
43	Swatch A	Swatch B	Swatch C	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater D	Sweater D	Sweater D
44	Swatch A	Swatch B	Swatch B	Swatch C	Swatch C	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater D	Sweater D	Sweater C	Sweater A	Sweater A
45	Swatch B	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 2	Sweater B	Sweater B	Sweater B	Sweater A	Sweater A	Sweater C
46	Swatch A	Swatch C	Swatch B	Swatch C	Swatch D	Sweater 1	Sweater 1	Sweater 1	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
47	Swatch A	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater D	Sweater B	Sweater C	Sweater C	Sweater C
48	Swatch A	Swatch C	Swatch D	Swatch C	Swatch C	Sweater 1	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater 2	Sweater D	Sweater B	Sweater B	Sweater C	Sweater A	Sweater C
49	Swatch A	Swatch B	Swatch C	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 4	Sweater 3	Sweater 3	Sweater 2	Sweater A	Sweater D	Sweater D	Sweater B	Sweater C	Sweater C
50	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater A	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
51	Swatch D	Swatch C	Swatch A	Swatch B	Swatch C	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater A	Sweater B	Sweater D	Sweater C	Sweater D
52	Swatch B	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater B	Sweater A	Sweater D	Sweater C	Sweater C	Sweater C
53	Swatch A	Swatch C	Swatch A	Swatch B	Swatch D	Sweater 3	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater B
54	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 3	Sweater C	Sweater B	Sweater D	Sweater A	Sweater A	Sweater A
55	Swatch A	Swatch B	Swatch B	Swatch C	Swatch D	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater C	Sweater B	Sweater D	Sweater D	Sweater A	Sweater C
56	Swatch D	Swatch C	Swatch D	Swatch B	Swatch D	Sweater 1	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater C	Sweater C	Sweater C	Sweater D	Sweater D	Sweater D
57	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 4	Sweater 4	Sweater 4	Sweater 2	Sweater 2	Sweater 2	Sweater D	Sweater D	Sweater D	Sweater B	Sweater B	Sweater C
58	Swatch C	Swatch C	Swatch A	Swatch C	Swatch A	Sweater 1	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater B	Sweater B	Sweater B
59	Swatch D	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 2	Sweater 3	Sweater 2	Sweater 3	Sweater B	Sweater C	Sweater C	Sweater A	Sweater D	Sweater A
60	Swatch B	Swatch C	Swatch B	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
61	Swatch B	Swatch C	Swatch B	Swatch D	Swatch C	Sweater 2	Sweater 3	Sweater 2	Sweater 3	Sweater 2	Sweater 3	Sweater B	Sweater C	Sweater B	Sweater C	Sweater B	Sweater C
62	Swatch A	Swatch C	Swatch B	Swatch D	Swatch D	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 2	Sweater 3	Sweater B	Sweater B	Sweater C	Sweater B	Sweater A	Sweater C
63	Swatch A	Swatch D	Swatch A	Swatch C	Swatch C	Sweater 4	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 3	Sweater D	Sweater D	Sweater D	Sweater B	Sweater B	Sweater B
64	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 4	Sweater 4	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater D	Sweater D	Sweater A	Sweater C	Sweater C	Sweater C
65	Swatch D	Swatch D	Swatch B	Swatch C	Swatch B	Sweater 2	Sweater 2	Sweater 1	Sweater 2	Sweater 4	Sweater 1	Sweater C	Sweater B	Sweater A	Sweater C	Sweater C	Sweater A
66	Swatch A	Swatch A	Swatch A	Swatch D	Swatch B	Sweater 4	Sweater 1	Sweater 1	Sweater 3	Sweater 2	Sweater 4	Sweater C	Sweater B	Sweater A	Sweater D	Sweater B	Sweater B
67	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater A	Sweater D	Sweater A	Sweater C	Sweater C	Sweater B
68	Swatch A	Swatch B	Swatch B	Swatch D	Swatch C	Sweater 4	Sweater 4	Sweater 4	Sweater 3	Sweater 3	Sweater 4	Sweater B	Sweater B	Sweater A	Sweater D	Sweater C	Sweater C
69	Swatch A	Swatch C	Swatch B	Swatch C	Swatch D	Sweater 3	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater A	Sweater B	Sweater C	Sweater C	Sweater C
70	Swatch D	Swatch C	Swatch B	Swatch A	Swatch B	Sweater 1	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater B	Sweater B	Sweater D	Sweater C	Sweater C

Participant	QUESTION 1: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed descriptions:						QUESTION 2: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
	CLASSIC	OLD FASHIONED	SPORTY	FEMININE	ELEGANT	MODERN	MOST CREATIVE / INTERESTING	MOST FASHIONABLE / STYLISH	MOST LIKELY TO BUY A SWEATER IN THIS	LEAST CREATIVE / INTERESTING	LEAST FASHIONABLE / STYLISH	LEAST LIKELY TO BUY A SWEATER IN THIS
71	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 4	Swatch 2	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 4
72	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 4
73	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 1
74	Swatch 1	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 3
75	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 4
76	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 4	Swatch 3
77	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2
78	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 2	Swatch 3	Swatch 1
79	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 4	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 4
80	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 4	Swatch 2
81	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 2	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 4
82	Swatch 3	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 1
83	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 2
84	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 4
85	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 4
86	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 2
87	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4
88	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1
89	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 2
90	Swatch 3	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 4
91	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 2	Swatch 2	Swatch 2
92	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 3
93	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 2
94	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 3	Swatch 4
95	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 2
96	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 2	Swatch 2
97	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 2
98	Swatch 4	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 1	Swatch 2
99	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2
100	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4
101	Swatch 1	Swatch 3	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 1	Swatch 1
102	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 1
103	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 4	Swatch 2
104	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 2
105	Swatch 2	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 2
106	Swatch 1	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 2
107	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1
108	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3
109	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4
110	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 4	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 1
111	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 1
112	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 1
113	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 2	Swatch 4	Swatch 2	Swatch 2	Swatch 3	Swatch 1	Swatch 3
114	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 3
115	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4
116	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 4
117	Swatch 1	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 3	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2
118	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 3
119	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 2
120	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 2
121	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3
122	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 4
123	Swatch 3	Swatch 4	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2
124	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 1
125	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 4
126	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 2
127	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 4
128	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2
129	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4	Swatch 4	Swatch 3	Swatch 2	Swatch 2
130	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 4
131	Swatch 4	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 4
132	Swatch 2	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 4
133	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 2
134	Swatch 2	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 3
135	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 4
136	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 4	Swatch 2	Swatch 3
137	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2
138	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 1	Swatch 3	Swatch 3	Swatch 3
139	Swatch 3	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 1
140	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2

	QUESTION 3: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					QUESTION 4: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:						QUESTION 5: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
Participant	MOST SOFT	MOST SHINY	MOST FLUFFY	LEAST THICK	LEAST SMOOTH	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE
71	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 3	Sweater 1	Sweater 4	Sweater 2	Sweater 2	Sweater A	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
72	Swatch A	Swatch A	Swatch A	Swatch A	Swatch B	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
73	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater 3	Sweater 1	Sweater D	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
74	Swatch D	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater B	Sweater A	Sweater C	Sweater D	Sweater C
75	Swatch A	Swatch C	Swatch B	Swatch C	Swatch A	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater A	Sweater B	Sweater A	Sweater C	Sweater C	Sweater C
76	Swatch A	Swatch B	Swatch C	Swatch C	Swatch D	Sweater 2	Sweater 2	Sweater 1	Sweater 2	Sweater 3	Sweater 2	Sweater D	Sweater B	Sweater C	Sweater A	Sweater D	Sweater C
77	Swatch C	Swatch C	Swatch C	Swatch C	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater C	Sweater C	Sweater C	Sweater C	Sweater C	Sweater C
78	Swatch A	Swatch B	Swatch D	Swatch C	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 2	Sweater 3	Sweater A	Sweater B	Sweater C	Sweater A	Sweater D	Sweater C
79	Swatch B	Swatch B	Swatch B	Swatch B	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater 3	Sweater C	Sweater B	Sweater B	Sweater B	Sweater B	Sweater B
80	Swatch A	Swatch C	Swatch A	Swatch D	Swatch A	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 4	Sweater C	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
81	Swatch A	Swatch C	Swatch B	Swatch D	Swatch D	Sweater 3	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater A	Sweater D	Sweater A	Sweater C	Sweater C	Sweater B
82	Swatch C	Swatch B	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 2	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
83	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 2	Sweater B	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C
84	Swatch B	Swatch C	Swatch D	Swatch D	Swatch A	Sweater 2	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
85	Swatch A	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 4	Sweater B	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
86	Swatch C	Swatch C	Swatch C	Swatch C	Swatch C	Sweater 2	Sweater 2	Sweater 2	Sweater 2	Sweater 2	Sweater 2	Sweater C	Sweater C	Sweater C	Sweater C	Sweater C	Sweater C
87	Swatch A	Swatch C	Swatch A	Swatch C	Swatch D	Sweater 2	Sweater 4	Sweater 4	Sweater 1	Sweater 1	Sweater 1	Sweater B	Sweater D	Sweater D	Sweater C	Sweater C	Sweater C
88	Swatch A	Swatch A	Swatch A	Swatch A	Swatch A	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A
89	Swatch A	Swatch B	Swatch C	Swatch D	Swatch B	Sweater 3	Sweater 2	Sweater 2	Sweater 3	Sweater 2	Sweater 1	Sweater A	Sweater B	Sweater C	Sweater B	Sweater A	Sweater B
90	Swatch A	Swatch C	Swatch C	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater C	Sweater B	Sweater C	Sweater B	Sweater B
91	Swatch A	Swatch B	Swatch A	Swatch B	Swatch C	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
92	Swatch A	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 1	Sweater 3	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater B	Sweater A	Sweater C	Sweater D	Sweater A	Sweater B
93	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 1	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
94	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater D
95	Swatch C	Swatch B	Swatch D	Swatch D	Swatch C	Sweater 3	Sweater 4	Sweater 3	Sweater 4	Sweater 2	Sweater 4	Sweater C	Sweater B	Sweater C	Sweater C	Sweater C	Sweater C
96	Swatch A	Swatch C	Swatch A	Swatch B	Swatch D	Sweater 3	Sweater 1	Sweater 3	Sweater 1	Sweater 1	Sweater 4	Sweater B	Sweater C	Sweater A	Sweater C	Sweater A	Sweater C
97	Swatch A	Swatch B	Swatch C	Swatch D	Swatch C	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater D	Sweater C	Sweater A	Sweater B	Sweater B
98	Swatch B	Swatch D	Swatch C	Swatch A	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater D	Sweater D	Sweater A
99	Swatch A	Swatch B	Swatch A	Swatch D	Swatch A	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
100	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 3	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 1	Sweater A	Sweater B	Sweater A	Sweater D	Sweater C	Sweater C
101	Swatch A	Swatch C	Swatch B	Swatch D	Swatch A	Sweater 2	Sweater 3	Sweater 3	Sweater 2	Sweater 4	Sweater 4	Sweater A	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
102	Swatch A	Swatch B	Swatch C	Swatch D	Swatch C	Sweater 1	Sweater 4	Sweater 2	Sweater 4	Sweater 2	Sweater 3	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A
103	Swatch B	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 4	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater D	Sweater D	Sweater C	Sweater D	Sweater B	Sweater B
104	Swatch A	Swatch A	Swatch B	Swatch B	Swatch B	Sweater 4	Sweater 1	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater C	Sweater D	Sweater A	Sweater C	Sweater C	Sweater C
105	Swatch A	Swatch D	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater B
106	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 1	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
107	Swatch A	Swatch B	Swatch C	Swatch D	Swatch D	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater 1	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A	Sweater A
108	Swatch B	Swatch B	Swatch A	Swatch C	Swatch C	Sweater 2	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater D
109	Swatch A	Swatch C	Swatch A	Swatch C	Swatch C	Sweater 4	Sweater 1	Sweater 1	Sweater 2	Sweater 2	Sweater 2	Sweater D	Sweater D	Sweater D	Sweater C	Sweater B	Sweater B
110	Swatch A	Swatch C	Swatch A	Swatch D	Swatch A	Sweater 1	Sweater 1	Sweater 3	Sweater 4	Sweater 2	Sweater 4	Sweater C	Sweater C	Sweater D	Sweater B	Sweater B	Sweater B
111	Swatch D	Swatch C	Swatch B	Swatch D	Swatch C	Sweater 1	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater C	Sweater D	Sweater D	Sweater D
112	Swatch D	Swatch B	Swatch A	Swatch B	Swatch D	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 2	Sweater 3	Sweater B	Sweater B	Sweater A	Sweater C	Sweater C	Sweater D
113	Swatch B	Swatch C	Swatch B	Swatch C	Swatch B	Sweater 3	Sweater 2	Sweater 3	Sweater 4	Sweater 1	Sweater 4	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
114	Swatch A	Swatch C	Swatch B	Swatch C	Swatch D	Sweater 2	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater A	Sweater A	Sweater A
115	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater 2	Sweater B	Sweater A	Sweater B	Sweater C	Sweater C	Sweater C
116	Swatch C	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
117	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater A	Sweater B	Sweater A	Sweater C	Sweater C	Sweater A
118	Swatch D	Swatch C	Swatch A	Swatch D	Swatch A	Sweater 1	Sweater 1	Sweater 1	Sweater 3	Sweater 2	Sweater 2	Sweater C	Sweater C	Sweater C	Sweater B	Sweater A	Sweater B
119	Swatch C	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater D	Sweater B	Sweater A	Sweater C	Sweater A
120	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater C	Sweater B	Sweater D	Sweater A	Sweater C
121	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater D	Sweater B	Sweater B	Sweater C	Sweater A	Sweater C
122	Swatch C	Swatch B	Swatch A	Swatch B	Swatch D	Sweater 1	Sweater 3	Sweater 3	Sweater 2	Sweater 1	Sweater 1	Sweater C	Sweater B	Sweater C	Sweater A	Sweater A	Sweater A
123	Swatch D	Swatch C	Swatch B	Swatch D	Swatch A	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater B	Sweater D	Sweater D	Sweater A	Sweater A	Sweater C
124	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater 2	Sweater B	Sweater D	Sweater B	Sweater D	Sweater B	Sweater C
125	Swatch D	Swatch C	Swatch A	Swatch B	Swatch B	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
126	Swatch D	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
127	Swatch A	Swatch C	Swatch D	Swatch B	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater A	Sweater D	Sweater B	Sweater B	Sweater C
128	Swatch A	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
129	Swatch A	Swatch C	Swatch A	Swatch A	Swatch B	Sweater 2	Sweater 2	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater B	Sweater C	Sweater B	Sweater C	Sweater A	Sweater D
130	Swatch A	Swatch C	Swatch A	Swatch C	Swatch A	Sweater 3	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
131	Swatch A	Swatch C	Swatch A	Swatch B	Swatch C	Sweater 1	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater B	Sweater A	Sweater B	Sweater C	Sweater D	Sweater C
132	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater A	Sweater C	Sweater C	Sweater C	Sweater B	Sweater D
133	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater B	Sweater B	Sweater C	Sweater A	Sweater C
134	Swatch A	Swatch C	Swatch B	Swatch D	Swatch C	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater B	Sweater D	Sweater A	Sweater B	Sweater C
135	Swatch C	Swatch D	Swatch A	Swatch C	Swatch B	Sweater 3	Sweater 3	Sweater 2	Sweater 1	Sweater 4	Sweater 1	Sweater B	Sweater D	Sweater B	Sweater C	Sweater D	Sweater D
136	Swatch A	Swatch C	Swatch A	Swatch B	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 1	Sweater A	Sweater D	Sweater D	Sweater C	Sweater C	Sweater C
137	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater A	Sweater A	Sweater D	Sweater B	Sweater B
138	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 4	Sweater 2	Sweater 1	Sweater 3	Sweater 1	Sweater B	Sweater D	Sweater C	Sweater A	Sweater A	Sweater D
139	Swatch D	Swatch C	Swatch B	Swatch D	Swatch A	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
140	Swatch D	Swatch C	Swatch A	Swatch C	Swatch A	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater C	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A

	QUESTION 1: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed descriptions:						QUESTION 2: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
Participant	CLASSIC	OLD FASHIONED	SPORTY	FEMININE	ELEGANT	MODERN	MOST CREATIVE / INTERESTING	MOST FASHIONABLE / STYLISH	MOST LIKELY TO BUY A SWEATER IN THIS	LEAST CREATIVE / INTERESTING	LEAST FASHIONABLE / STYLISH	LEAST LIKELY TO BUY A SWEATER IN THIS
141	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 2
142	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 2
143	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 2
144	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2
145	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2
146	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 3	Swatch 1	Swatch 1
147	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1
148	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 1
149	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 4
150	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 3	Swatch 4
151	Swatch 2	Swatch 4	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 3
152	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 2	Swatch 2
153	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1
154	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 1
155	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 3
156	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 4
157	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1
158	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1
159	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 2
160	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 2
161	Swatch 1	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 4
162	Swatch 3	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 2
163	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 2	Swatch 4
164	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 4
165	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 4	Swatch 4
166	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 4
167	Swatch 2	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 2
168	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 3	Swatch 2
169	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 3	Swatch 3
170	Swatch 2	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 3
171	Swatch 2	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 2
172	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 2	Swatch 2	Swatch 3	Swatch 4	Swatch 4
173	Swatch 3	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 1
174	Swatch 2	Swatch 3	Swatch 2	Swatch 3	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 4	Swatch 4	Swatch 2
175	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 1	Swatch 4	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 2
176	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 2
177	Swatch 1	Swatch 3	Swatch 3	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 2
178	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2
179	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4
180	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 1
181	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 2	Swatch 2	Swatch 2
182	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 2	Swatch 3
183	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 3	Swatch 3
184	Swatch 3	Swatch 3	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 4	Swatch 2	Swatch 2	Swatch 2
185	Swatch 3	Swatch 2	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 1
186	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 1	Swatch 1	Swatch 1
187	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 4	Swatch 1
188	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 2	Swatch 2
189	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 3
190	Swatch 1	Swatch 4	Swatch 2	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 4
191	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 1	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 4
192	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 4	Swatch 1
193	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 2	Swatch 2
194	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 4	Swatch 4	Swatch 4
195	Swatch 4	Swatch 3	Swatch 1	Swatch 3	Swatch 2	Swatch 2	Swatch 1	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 4
196	Swatch 3	Swatch 2	Swatch 2	Swatch 3	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 2
197	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 3	Swatch 2
198	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 3
199	Swatch 3	Swatch 2	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 2
200	Swatch 3	Swatch 1	Swatch 1	Swatch 4	Swatch 4	Swatch 2	Swatch 4	Swatch 2	Swatch 4	Swatch 1	Swatch 1	Swatch 1
201	Swatch 2	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 4	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 2	Swatch 2
202	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 3	Swatch 2	Swatch 2	Swatch 4	Swatch 3	Swatch 2	Swatch 3	Swatch 2
203	Swatch 3	Swatch 2	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 2
204	Swatch 3	Swatch 1	Swatch 3	Swatch 4	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 3	Swatch 4	Swatch 3	Swatch 2
205	Swatch 2	Swatch 3	Swatch 1	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 4
206	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 3	Swatch 4	Swatch 2	Swatch 1	Swatch 2	Swatch 4	Swatch 4	Swatch 4
207	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 3	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 4
208	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 1	Swatch 2	Swatch 1	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4
209	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 3	Swatch 1	Swatch 2	Swatch 3	Swatch 3	Swatch 4	Swatch 2	Swatch 1
210	Swatch 3	Swatch 3	Swatch 2	Swatch 1	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 3
211	Swatch 3	Swatch 3	Swatch 2	Swatch 4	Swatch 4	Swatch 1	Swatch 1	Swatch 1	Swatch 2	Swatch 4	Swatch 3	Swatch 1

	QUESTION 3: Below are images of 4 knitted swatches. According to your opinion, please select ONE that BEST fits each of the listed criteria:					QUESTION 4: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:						QUESTION 5: Below are digital images of 4 sweater styles. According to your opinion, please select ONE that BEST fits each of the listed criteria:					
Participant	MOST SOFT	MOST SHINY	MOST FLUFFY	LEAST THICK	LEAST SMOOTH	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE	MOST CREATIVE	MOST FASHIONABLE	MOST WANT TO BUY	LEAST INTERSTING	LEAST STYLISH	LEAST SELLABLE
141	Swatch A	Swatch A	Swatch D	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater B	Sweater B	Sweater A	Sweater C	Sweater C	Sweater C
142	Swatch B	Swatch C	Swatch A	Swatch A	Swatch C	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 4	Sweater B	Sweater D	Sweater B	Sweater C	Sweater C	Sweater C
143	Swatch B	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 2	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 3	Sweater B	Sweater C	Sweater B	Sweater C	Sweater C	Sweater B
144	Swatch A	Swatch D	Swatch B	Swatch C	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 1	Sweater 2	Sweater A	Sweater D	Sweater D	Sweater C	Sweater C	Sweater B
145	Swatch A	Swatch B	Swatch D	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater D	Sweater C	Sweater A	Sweater A	Sweater B
146	Swatch A	Swatch B	Swatch D	Swatch C	Swatch A	Sweater 1	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 3	Sweater A	Sweater A	Sweater C	Sweater B	Sweater B	Sweater B
147	Swatch A	Swatch D	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
148	Swatch A	Swatch C	Swatch B	Swatch C	Swatch A	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater 2	Sweater A	Sweater B	Sweater D	Sweater C	Sweater D	Sweater C
149	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 3	Sweater 2	Sweater 4	Sweater 1	Sweater 1	Sweater B	Sweater C	Sweater C	Sweater A	Sweater A	Sweater D
150	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 4	Sweater 4	Sweater 1	Sweater 2	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
151	Swatch C	Swatch B	Swatch C	Swatch D	Swatch A	Sweater 4	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater C	Sweater D	Sweater B	Sweater D	Sweater A	Sweater D
152	Swatch D	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater C
153	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater A	Sweater D	Sweater D	Sweater C	Sweater B	Sweater C
154	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater C	Sweater B	Sweater A	Sweater D	Sweater C	Sweater D
155	Swatch A	Swatch C	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 4	Sweater 3	Sweater 1	Sweater 4	Sweater 2	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater C
156	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater B	Sweater A	Sweater D	Sweater D	Sweater C
157	Swatch A	Swatch C	Swatch A	Swatch A	Swatch B	Sweater 1	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 1	Sweater A	Sweater C	Sweater A	Sweater B	Sweater D	Sweater D
158	Swatch A	Swatch B	Swatch D	Swatch C	Swatch C	Sweater 1	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater A	Sweater D	Sweater D	Sweater B	Sweater B	Sweater B
159	Swatch A	Swatch B	Swatch D	Swatch C	Swatch B	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater C	Sweater D	Sweater A	Sweater A	Sweater C
160	Swatch A	Swatch B	Swatch A	Swatch C	Swatch D	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 2	Sweater C	Sweater A	Sweater C	Sweater B	Sweater D	Sweater D
161	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater B	Sweater D	Sweater A	Sweater A	Sweater B
162	Swatch D	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater B	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
163	Swatch C	Swatch A	Swatch B	Swatch C	Swatch B	Sweater 4	Sweater 3	Sweater 4	Sweater 1	Sweater 2	Sweater 1	Sweater B	Sweater A	Sweater D	Sweater C	Sweater B	Sweater C
164	Swatch A	Swatch C	Swatch B	Swatch C	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 4	Sweater B	Sweater D	Sweater A	Sweater C	Sweater C	Sweater B
165	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 3	Sweater 1	Sweater 4	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
166	Swatch A	Swatch C	Swatch A	Swatch D	Swatch D	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater 2	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater A	Sweater C	Sweater A
167	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater C	Sweater D	Sweater B	Sweater D	Sweater A	Sweater C
168	Swatch A	Swatch B	Swatch A	Swatch C	Swatch D	Sweater 1	Sweater 4	Sweater 1	Sweater 2	Sweater 3	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater B	Sweater C	Sweater C
169	Swatch A	Swatch C	Swatch A	Swatch B	Swatch D	Sweater 3	Sweater 1	Sweater 1	Sweater 4	Sweater 2	Sweater 2	Sweater C	Sweater A	Sweater A	Sweater D	Sweater B	Sweater B
170	Swatch D	Swatch C	Swatch B	Swatch C	Swatch A	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater C	Sweater D	Sweater D	Sweater A	Sweater A	Sweater A
171	Swatch C	Swatch A	Swatch D	Swatch C	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 4	Sweater 2	Sweater B	Sweater B	Sweater C	Sweater A	Sweater A	Sweater D
172	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 1	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
173	Swatch A	Swatch B	Swatch A	Swatch C	Swatch D	Sweater 4	Sweater 4	Sweater 4	Sweater 2	Sweater 2	Sweater 3	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
174	Swatch A	Swatch B	Swatch C	Swatch A	Swatch D	Sweater 1	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater A	Sweater C	Sweater C
175	Swatch A	Swatch C	Swatch A	Swatch B	Swatch A	Sweater 3	Sweater 3	Sweater 4	Sweater 2	Sweater 2	Sweater 1	Sweater B	Sweater D	Sweater D	Sweater C	Sweater C	Sweater C
176	Swatch D	Swatch B	Swatch A	Swatch A	Swatch B	Sweater 2	Sweater 2	Sweater 2	Sweater 1	Sweater 2	Sweater 2	Sweater C	Sweater B	Sweater A	Sweater A	Sweater C	Sweater C
177	Swatch A	Swatch B	Swatch B	Swatch C	Swatch C	Sweater 1	Sweater 1	Sweater 4	Sweater 3	Sweater 3	Sweater 2	Sweater A	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
178	Swatch A	Swatch C	Swatch B	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 1	Sweater A	Sweater D	Sweater D	Sweater A	Sweater A	Sweater B
179	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
180	Swatch A	Swatch B	Swatch A	Swatch C	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater C	Sweater D	Sweater B	Sweater A	Sweater C
181	Swatch A	Swatch B	Swatch A	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater 2	Sweater C	Sweater C	Sweater C	Sweater A	Sweater A	Sweater A
182	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 1	Sweater 3	Sweater 3	Sweater 4	Sweater A	Sweater D	Sweater A	Sweater C	Sweater D	Sweater C
183	Swatch A	Swatch B	Swatch B	Swatch D	Swatch C	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 1	Sweater B	Sweater D	Sweater D	Sweater C	Sweater A	Sweater C
184	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 2	Sweater 2	Sweater 1	Sweater 1	Sweater 1	Sweater A	Sweater C	Sweater C	Sweater B	Sweater B	Sweater B
185	Swatch A	Swatch C	Swatch B	Swatch D	Swatch D	Sweater 1	Sweater 1	Sweater 1	Sweater 3	Sweater 3	Sweater 3	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
186	Swatch A	Swatch C	Swatch B	Swatch A	Swatch D	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 2	Sweater 2	Sweater D	Sweater C	Sweater A	Sweater B	Sweater B	Sweater B
187	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater D	Sweater D	Sweater C	Sweater C	Sweater C
188	Swatch A	Swatch B	Swatch A	Swatch C	Swatch D	Sweater 2	Sweater 2	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater A	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
189	Swatch A	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 4	Sweater 2	Sweater 1	Sweater 3	Sweater 2	Sweater 2	Sweater C	Sweater B	Sweater C	Sweater D	Sweater D	Sweater D
190	Swatch D	Swatch C	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 4	Sweater 2	Sweater 4	Sweater 4	Sweater 2	Sweater A	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
191	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 4	Sweater 1	Sweater 3	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater D	Sweater D	Sweater D
192	Swatch D	Swatch C	Swatch A	Swatch B	Swatch B	Sweater 4	Sweater 4	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater C	Sweater A	Sweater D	Sweater D	Sweater D
193	Swatch A	Swatch B	Swatch A	Swatch D	Swatch C	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 2	Sweater 2	Sweater B	Sweater D	Sweater D	Sweater A	Sweater C	Sweater C
194	Swatch B	Swatch C	Swatch B	Swatch C	Swatch A	Sweater 3	Sweater 2	Sweater 3	Sweater 4	Sweater 4	Sweater 3	Sweater C	Sweater C	Sweater C	Sweater D	Sweater A	Sweater A
195	Swatch D	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 1	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
196	Swatch D	Swatch B	Swatch A	Swatch C	Swatch B	Sweater 2	Sweater 1	Sweater 2	Sweater 1	Sweater 4	Sweater 1	Sweater B	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
197	Swatch D	Swatch C	Swatch A	Swatch C	Swatch C	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater 3	Sweater 3	Sweater B	Sweater A	Sweater B	Sweater C	Sweater D	Sweater D
198	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 2	Sweater 4	Sweater 3	Sweater 1	Sweater 2	Sweater 2	Sweater C	Sweater B	Sweater D	Sweater A	Sweater B	Sweater A
199	Swatch A	Swatch C	Swatch A	Swatch B	Swatch C	Sweater 3	Sweater 2	Sweater 1	Sweater 4	Sweater 4	Sweater 4	Sweater A	Sweater B	Sweater D	Sweater C	Sweater C	Sweater C
200	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater D	Sweater D	Sweater A	Sweater A	Sweater A
201	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 2	Sweater 4	Sweater 2	Sweater A	Sweater A	Sweater A	Sweater C	Sweater C	Sweater C
202	Swatch A	Swatch C	Swatch D	Swatch B	Swatch B	Sweater 1	Sweater 2	Sweater 3	Sweater 2	Sweater 4	Sweater 3	Sweater B	Sweater A	Sweater B	Sweater C	Sweater B	Sweater C
203	Swatch B	Swatch A	Swatch A	Swatch C	Swatch C	Sweater 2	Sweater 2	Sweater 2	Sweater 3	Sweater 3	Sweater 2	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater C
204	Swatch A	Swatch C	Swatch D	Swatch C	Swatch B	Sweater 3	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater D	Sweater C	Sweater A	Sweater C	Sweater B	Sweater D
205	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 1	Sweater 4	Sweater 4	Sweater 2	Sweater B	Sweater C	Sweater A	Sweater D	Sweater D	Sweater D
206	Swatch A	Swatch C	Swatch A	Swatch C	Swatch C	Sweater 2	Sweater 1	Sweater 1	Sweater 4	Sweater 4	Sweater 3	Sweater C	Sweater C	Sweater C	Sweater D	Sweater D	Sweater B
207	Swatch D	Swatch C	Swatch D	Swatch C	Swatch A	Sweater 3	Sweater 1	Sweater 3	Sweater 4	Sweater 4	Sweater 4	Sweater B	Sweater B	Sweater B	Sweater A	Sweater D	Sweater C
208	Swatch D	Swatch C	Swatch D	Swatch D	Swatch A	Sweater 2	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater D	Sweater D	Sweater D	Sweater D	Sweater C	Sweater B
209	Swatch A	Swatch C	Swatch A	Swatch D	Swatch B	Sweater 3	Sweater 3	Sweater 4	Sweater 1	Sweater 1	Sweater 1	Sweater B	Sweater D	Sweater D	Sweater A	Sweater C	Sweater C
210	Swatch A	Swatch C	Swatch B	Swatch D	Swatch A	Sweater 3	Sweater 3	Sweater 3	Sweater 2	Sweater 1	Sweater 1	Sweater D	Sweater D	Sweater D	Sweater C	Sweater C	Sweater C
211	Swatch D	Swatch C	Swatch D	Swatch D	Swatch A	Sweater 3	Sweater 2	Sweater 2	Sweater 4	Sweater 4	Sweater 3	Sweater B	Sweater B	Sweater B	Sweater C	Sweater C	Sweater A

Appendix B: Data of Research Objective 3 - Interview Transcripts

Below are the raw transcripts for the interviews conducted for Objective 3. They were generated automatically via the live transcription function in the “MS Teams” video conferencing platform which was used. Aside from the deletion of obvious superfluous speech disfluencies or filler words, the transcription did not undergo any edits or rewordings. Therefore note that they might contain slight incongruencies in language due to potential transcription inaccuracies, however in the actual data analysis process, the video/audio recordings were reviewed alongside to corroborate the meaning.

For privacy reasons, the names of the interviewees have been redacted and replaced with the titles “Interviewee 1”, “Interviewee 2”…and so on. The interviewer, the author and co-investigator of this study, is listed as “WU, Xiaopei [Student]”.

Interviewee 1:

00:00:00.000 --> 00:00:07.840

WU, Xiaopei [Student]

Conversation, basically, and then I'm gonna record it. This is why I'm using teams because it allows.

00:00:00.810 --> 00:00:01.660

Interviewee 1

Umm, sure.

00:00:07.510 --> 00:00:07.880

Interviewee 1

Mm-hmm.

00:00:08.280 --> 00:00:08.820

WU, Xiaopei [Student]

It's easily.

00:00:10.220 --> 00:00:13.350

WU, Xiaopei [Student]

Umm cool so.

00:00:14.200 --> 00:00:29.350

WU, Xiaopei [Student]

We already talked about like your background, and I know you're working experience and then you talked about your current role. So one of the first questions to get is talking is what do you know about how artificial intelligence is being used in the fashion industry?

00:00:32.950 --> 00:00:43.160

Interviewee 1

So I'm not. Yeah, I'm not familiar with it at all. I wasn't sure that it was being used. I know that there's digitization of certain processes like fittings.

00:00:43.900 --> 00:00:47.000

Interviewee 1

Umm, but other than like us.

00:00:47.980 --> 00:00:54.250

Interviewee 1

You know, I'm more familiar with, like, human aided sides of technology as opposed to, like, fully computerized systems.

00:00:55.400 --> 00:00:57.150

Interviewee 1

But I'm sure you know like.

00:00:58.150 --> 00:01:00.220

Interviewee 1

I haven't looked into it specifically, but.

00:01:00.340 --> 00:01:11.090

Interviewee 1

Umm. If I think of like some of the like knitted shoes, I'm sure those are knitted into shape by computer and then like someone has to put it together or something but.

00:01:13.770 --> 00:01:17.950

WU, Xiaopei [Student]

No, that's a good indicator. I feel like because it's.

00:01:18.650 --> 00:01:26.500

WU, Xiaopei [Student]

What I expect is most people now, even though it's been talked about on a higher level, it seems like it's not really.

00:01:27.430 --> 00:01:37.710

WU, Xiaopei [Student]

Being used like practically data to day like I think to your point more people are just using digital or like computer aided design type software versus.

00:01:42.570 --> 00:01:54.060

WU, Xiaopei [Student]

Well, I suppose, UM, you answered the second question because the second question was, have you seen AI involved in the creative design process for knitwear, other categories? So if you're saying so?

00:01:55.970 --> 00:01:56.920

WU, Xiaopei [Student]

If not.

00:01:57.900 --> 00:02:04.190

WU, Xiaopei [Student]

Would you see it as something that could facilitate the creative design process?

00:02:06.010 --> 00:02:10.060

Interviewee 1

Yes and no. Actually. In conversation, someone brought up.

00:02:11.440 --> 00:02:17.870

Interviewee 1

The UM, a software that takes sort of like your best sellers and creates new styles out of it, right?

00:02:19.070 --> 00:02:23.280

Interviewee 1

But even within that you have to have, uh, some sort of input go into it.

00:02:24.010 --> 00:02:25.970

Interviewee 1

It's not like it can just.

00:02:26.110 --> 00:02:29.560

Interviewee 1

Umm, like form those ideas on its own.

00:02:32.720 --> 00:02:38.440

Interviewee 1

In terms of how it's used as a customer, I wouldn't know.

00:02:39.160 --> 00:02:43.560

Interviewee 1

And as a professional, if it's been used, it means I'm obsolete, so I wouldn't.

00:02:45.240 --> 00:02:46.200

Interviewee 1

You know, so.

00:02:45.510 --> 00:02:53.520

WU, Xiaopei [Student]

Yeah. Yeah, yeah, yeah, that's that's huge. Paradox is that obviously as a designer, you're like, no, I don't wanna. It's my job. So. But yeah but like.

00:02:53.400 --> 00:02:57.480

Interviewee 1

With a lot of things are very formulaic, so it would be extremely easy to.

00:02:57.640 --> 00:03:03.630

Interviewee 1

Umm. Create those things for like mass market let's say, but at the same time it's sort of like.

00:03:04.480 --> 00:03:08.240

Interviewee 1

It might be too expensive to Skellige for that level of.

00:03:11.720 --> 00:03:15.710

Interviewee 1

Sort of like market because usually tell us about a lower price point.

00:03:16.700 --> 00:03:19.480

WU, Xiaopei [Student]

Right. So to what extent?

00:03:20.370 --> 00:03:32.180

WU, Xiaopei [Student]

Is, let's say, just General Computer aided design and like digital softwares or virtual. I don't know if you guys are doing virtual sampling. So what extent is that involved in your current process?

00:03:33.660 --> 00:03:40.190

Interviewee 1

I'd say like 25%. So we get a lot of like digital renderings for things, for example like.

00:03:41.350 --> 00:03:44.890

Interviewee 1

We'll see the digital version of.

00:03:45.050 --> 00:03:52.620

Interviewee 1

Umm. Like a net or an approval? Or like we'll see a picture first before they like send us a physical thing.

00:03:56.030 --> 00:03:57.350

WU, Xiaopei [Student]

Wait a picture of a.

00:03:58.770 --> 00:04:01.640

WU, Xiaopei [Student]

Like the A Swash can you sort of like?

00:04:01.930 --> 00:04:07.090

Interviewee 1

Umm yeah. So like for example if it's something new, they'll send us the.

00:04:07.910 --> 00:04:11.180

Interviewee 1

The digital like screen of what? What would go in the machine?

00:04:13.090 --> 00:04:16.340

WU, Xiaopei [Student]

OK, but not like one of those VR type.

00:04:16.930 --> 00:04:22.420

Interviewee 1

No. Yeah. So I don't have, I don't have like 3D fit and I don't have a a.

00:04:17.940 --> 00:04:18.410

WU, Xiaopei [Student]

You mean?

00:04:21.450 --> 00:04:22.000

WU, Xiaopei [Student]

Ohh.

00:04:23.540 --> 00:04:26.570

Interviewee 1

Uh, yeah. So it's very, very minimal, if any.

00:04:27.320 --> 00:04:30.940

WU, Xiaopei [Student]

The digital isn't like for example, like for knitwear, you would see a.

00:04:31.660 --> 00:04:35.920

WU, Xiaopei [Student]

The digital like program, the knitting program, things like that. It's more like, OK.

00:04:35.610 --> 00:04:38.900

Interviewee 1

Umm, yeah, so you know how calido you can export.

00:04:36.680 --> 00:04:37.270

WU, Xiaopei [Student]

Got it.

00:04:39.830 --> 00:04:51.340

Interviewee 1

The the Swatch as an image and you can print it out and it's pretty like realistic. So something like that or if it's a Jaccard like the stitches in the grid format.

00:04:58.220 --> 00:04:58.950

WU, Xiaopei [Student]

So.

00:05:01.390 --> 00:05:19.320

WU, Xiaopei [Student]

Do you? OK, so I'm just going to show you I'm gonna share my screen and then kind of show you because you did the survey. Right. And the point of that was that, like, obviously some of ohh, I don't know if this was obvious to the person doing the survey, but like some of those images are.

00:05:07.740 --> 00:05:08.070

Interviewee 1

Umm.

00:05:20.330 --> 00:05:27.480

WU, Xiaopei [Student]

Real actual Swatch images and some of them are actually designed from scratch by computer, right? So it's just a very basic idea.

00:05:24.920 --> 00:05:25.520

Interviewee 1

Umm.

00:05:28.170 --> 00:05:46.180

WU, Xiaopei [Student]

But experimenting with this idea of what the potential of a computer is to from scratch kind of, well, you're training it based on the Swatch images, right? So from scratch, these kind of weird looking stitch, kind of some of them are weird looking stitch images and the potential use for that. And if you scale that.

00:05:35.210 --> 00:05:35.590

Interviewee 1

Umm.

00:05:47.120 --> 00:06:03.000

WU, Xiaopei [Student]

Because the experiment that the survey is based on is very simple one, but if you can scale it so that it has the computer as a capacity to really be like creative and kind of design all these options and for it to look more clear and all these things to be more refined like.

00:05:51.890 --> 00:05:52.260

Interviewee 1

Umm.

00:06:04.640 --> 00:06:14.170

WU, Xiaopei [Student]

To start thinking about how that could be helpful or not in a digital type process, but so I'm gonna sort of show share this and show you.

00:06:15.470 --> 00:06:16.510

WU, Xiaopei [Student]

It's my screen.

00:06:29.920 --> 00:06:39.570

WU, Xiaopei [Student]

Let's just say, hypothetically speaking, if there was this program that you could use and you could specify like attributes and give like inspiration images so.

00:06:41.050 --> 00:06:45.270

WU, Xiaopei [Student]

As a designer like whatever the theme is, even if it was like a Christmas sweater, right?

00:06:45.570 --> 00:06:46.410

Interviewee 1

Umm.

00:06:46.170 --> 00:06:53.090

WU, Xiaopei [Student]

Right. So you can kind of like put these inspiration images and you could specify to computer like if you would want like a chunky, a heavy gauge.

00:06:53.850 --> 00:07:15.300

WU, Xiaopei [Student]

UM, even like if you would say sporty, so some of in the survey there was like this one question, which was like, which do you think is feminine, which do you think is 40. So kind of like those descriptors, right. If you kind of describe it and then for the computer based on it being the algorithm it being trained it like giving all these creative options and then to use those options and sort of.

00:06:58.770 --> 00:06:59.230

Interviewee 1

Umm.

00:07:16.360 --> 00:07:18.830

WU, Xiaopei [Student]

Be able to integrate it into a virtual.

00:07:20.650 --> 00:07:23.620

WU, Xiaopei [Student]

One of those virtual 3D sampling programs, right? And sign into.

00:07:23.280 --> 00:07:23.680

Interviewee 1

Umm.

00:07:26.210 --> 00:07:31.560

WU, Xiaopei [Student]

Just that process. Do you think that that is something that we are very far from doing because?

00:07:32.230 --> 00:07:59.530

WU, Xiaopei [Student]

Or do you think it's something that's like potentially close? Like ohh. It's possible that this could work because I think where the where I feel like there's still a gap is at designers. I mean in a lot of companies now that they're still very far away from really embracing virtual images, right. It's really hard to. So yeah, I just wanted your input on like thinking about this potential idea, like how realistic or unrealistic do you think it is and why?

00:07:48.540 --> 00:07:49.080

Interviewee 1

Mm-hmm.

00:08:00.400 --> 00:08:02.530

Interviewee 1

I think it's extremely realistic.

00:08:03.630 --> 00:08:19.160

Interviewee 1

And I'll tell you, actually, the way we work is that we only sample one or two things at the beginning and then the rest we sell from paper. So like a paper print out. So a lot of our buying happens through the cat process, which is like.

00:08:18.770 --> 00:08:21.880

WU, Xiaopei [Student]

Without even getting a sample even.

00:08:21.710 --> 00:08:23.520

Interviewee 1

We might have like 1 sample.

00:08:24.130 --> 00:08:28.380

WU, Xiaopei [Student]

Ohh that's great to hear. I just like it's still go on, so return true.

00:08:26.110 --> 00:08:26.880

Interviewee 1

Uh-huh.

00:08:28.490 --> 00:08:31.180

Interviewee 1

So for example, if we have uh like 50 prints.

00:08:34.190 --> 00:08:34.940

Interviewee 1

Or.

00:08:36.080 --> 00:08:49.430

Interviewee 1

Even Jenny will talk about this during her interview, but like she can sell a sweater off the cat, basically. And so because of that, I think this is a process that could be very easily adopted.

00:08:50.500 --> 00:09:00.890

Interviewee 1

Umm, you know, even I think it's more like a trust thing between your vendor and your process. And if you're gonna deliver something that looks like the picture you're presenting.

00:09:01.860 --> 00:09:03.830

Interviewee 1

And you have the trust. I think it's very easy.

00:09:05.290 --> 00:09:07.750

WU, Xiaopei [Student]

Oh, that's a good point. Yeah. So it probably take.

00:09:08.990 --> 00:09:13.420

WU, Xiaopei [Student]

The trust, first with a certain like having building that relationship first before you can actually.

00:09:14.090 --> 00:09:18.040

WU, Xiaopei [Student]

Do that, but when you say selling off a cat, what is UM?

00:09:20.010 --> 00:09:22.990

WU, Xiaopei [Student]

So you've seen that be successful, like being able to.

00:09:22.700 --> 00:09:23.000

Interviewee 1

Yeah.

00:09:23.680 --> 00:09:24.380

WU, Xiaopei [Student]

In your own work.

00:09:23.980 --> 00:09:43.700

Interviewee 1

Yeah, total. Like, they'll buy them. They'll like, we'll have one so that they can feel it and touch it. But for example, that one comes in like 10 different prints. And so we won't have all the 10 different prints there. They'll just, like, pick from a print out like a paper. Literally. It's just a piece of paper and say ohh, I want like this five and then we'll go to production like.

00:09:44.430 --> 00:09:44.930

Interviewee 1

Information.

00:09:46.190 --> 00:09:53.060

WU, Xiaopei [Student]

Ohh gotcha. So very limited like sample physical sample, but mainly cat and then OK.

00:09:52.920 --> 00:09:56.050

Interviewee 1

Yeah, I mean, you wouldn't believe that with all the stuff behind me, but.

00:09:56.400 --> 00:10:00.360

WU, Xiaopei [Student]

I know like part of me because I it looks like a very traditional.

00:10:01.450 --> 00:10:04.550

WU, Xiaopei [Student]

Fashion office like, I mean, what I'm used to seeing, but.

00:10:05.720 --> 00:10:09.990

WU, Xiaopei [Student]

Yeah. OK. No, I it's find it hard to believe. I just still feel like, yeah, when I left.

00:10:11.100 --> 00:10:20.680

WU, Xiaopei [Student]

People are still we're starting to do the the virtuals things, but definitely was not very successful. There was still requesting a lot of a lot.

00:10:20.490 --> 00:10:28.500

Interviewee 1

Can you and and in terms of fully virtual, so some client meetings are completely like over zoom with a website basically?

00:10:29.210 --> 00:10:31.740

Interviewee 1

So and that has also worked before so.

00:10:32.660 --> 00:10:35.490

Interviewee 1

Umm, I think too like your technology thing.

00:10:36.510 --> 00:10:46.000

Interviewee 1

Umm yeah. Do you know, I think it's like, really kind of almost there. It just has to be implemented in a way that people feel comfortable using it.

00:10:47.610 --> 00:10:56.950

WU, Xiaopei [Student]

And then in terms of like having the cat and then you as a designer trying to achieve the cat by working with your factory or the seafoods and stuff.

00:10:57.740 --> 00:10:59.130

WU, Xiaopei [Student]

Has that? Do you feel like?

00:11:00.340 --> 00:11:09.630

WU, Xiaopei [Student]

It's usually always achievable or like if you kind of speak to other coworkers and you know or do you feel like that's been a huge challenge? Like, what's the fallout?

00:11:11.130 --> 00:11:19.940

Interviewee 1

I think it's 90% achievable. The fallout is the information gap between the designer and the machinery.

00:11:20.950 --> 00:11:40.760

Interviewee 1

And what could be possible? But then that's where, like the expert comes in where it says Ohh you can't do it this way with this like technique. But if you like switch it to be this or like if you change the gauge it you know like little things like that. So like you need someone to fill in the information gap which maybe in this case it's the machine.

00:11:50.860 --> 00:12:02.570

Interviewee 1

So, you know, even for like I don't know how they do 90% of these things, but even when I was doing very like involved stitches when I was doing sweaters that are more like fashion sweaters.

00:12:03.250 --> 00:12:12.320

Interviewee 1

I would sometimes literally just like cut up pictures of stitches that I liked and pieced them together in a way that makes sense, and I would get a sweater that looked just like it so.

00:12:14.330 --> 00:12:17.540

Interviewee 1

But I know like there's someone else on the other side interpreting the images.

00:12:20.150 --> 00:12:37.550

WU, Xiaopei [Student]

Alright, so now like the next question is about do you think systems like this, this hypothetical system and then just like I in general using virtual sampling, has it helped you as a designer be more creative? Does it give you space to be more creative?

00:12:38.120 --> 00:12:44.820

Interviewee 1

Yes, because I don't have to know everything you know. And so I can play with it and see what what comes out of it.

00:12:45.710 --> 00:12:47.180

Interviewee 1

So there is this freedom.

00:12:45.890 --> 00:12:49.350

WU, Xiaopei [Student]

Wait, what do you mean by you don't have to know everything? What? What?

00:12:49.300 --> 00:12:56.630

Interviewee 1

Meaning like I don't need to know if they're using like a computerized stole machine that can do like only seven colors, you know?

00:12:58.050 --> 00:12:58.400

WU, Xiaopei [Student]

OK.

00:12:58.530 --> 00:13:03.680

Interviewee 1

I I I just know ohh this is what I want the end product to be and so it's sort of.

00:13:04.890 --> 00:13:11.440

Interviewee 1

Allows me to just be more playful and like maybe even try things that. Ohh, maybe they didn't think they could do.

00:13:12.300 --> 00:13:17.410

Interviewee 1

From the production standpoint, but then because the sample came out great, it's possible kind of thing.

00:13:18.630 --> 00:13:18.990

WU, Xiaopei [Student]

OK.

00:13:20.030 --> 00:13:21.250

WU, Xiaopei [Student]

Great. And then?

00:13:20.930 --> 00:13:23.870

Interviewee 1

Yeah, I think it like increases creativity in general.

00:13:24.420 --> 00:13:24.750

WU, Xiaopei [Student]

OK.

00:13:25.480 --> 00:13:26.570

WU, Xiaopei [Student]

And then what about?

00:13:27.450 --> 00:13:44.910

WU, Xiaopei [Student]

Work efficiency in general in terms of both like timing, you know big things like timing, does it speed of time, which is I think very obvious because obviously virtual sampling takes cuts away. The time being physical. But like in terms of your day to day, using systems like this.

00:13:45.870 --> 00:13:52.930

WU, Xiaopei [Student]

Do you feel like it's definitely, uh, improved work confidence or are there a lot of inefficient parts to it still?

00:13:54.230 --> 00:13:58.220

Interviewee 1

I think as long as you have the initial data entry like correct.

00:13:59.590 --> 00:14:05.840

Interviewee 1

You know, so like the gauge that you want and the yarn that you want and the colors and then the rest is sort of like.

00:14:06.860 --> 00:14:11.900

Interviewee 1

I think it kind of like flows on its own. So I would say it was someone improve efficiency.

00:14:12.700 --> 00:14:19.770

Interviewee 1

Umm, maybe like there's a learning curve where like it's really hard at the beginning, but then once you like really know the program, it becomes super easy.

Interviewee 2:

00:00:00.000 --> 00:00:06.180

WU, Xiaopei [Student]

The consent form it'll take like a second. Literally. You just have to agree, but basically it's a green to.

00:00:03.060 --> 00:00:03.470

Interviewee 2

Alright.

00:00:42.210 --> 00:00:42.680

Interviewee 2

Done.

00:00:43.610 --> 00:00:46.680

WU, Xiaopei [Student]

Great. Thank you. OK, so.

00:00:47.100 --> 00:00:58.920

WU, Xiaopei [Student]

Umm, so wait, just actually this is part of the interview, but I just wanted to get an update on like your role now where you are because I are you? Yeah, just.

00:01:01.870 --> 00:01:07.150

Interviewee 2

Yeah, I'm at Lafayette. 148 is what they're called.

00:01:09.030 --> 00:01:11.700

Interviewee 2

Senior network designer also.

00:01:13.040 --> 00:01:14.530

WU, Xiaopei [Student]

So cool. When did you start there?

00:01:14.440 --> 00:01:14.910

Interviewee 2

Umm.

00:01:16.260 --> 00:01:18.070

Interviewee 2

September last year.

00:01:20.210 --> 00:01:25.940

Interviewee 2

No two years ago. Wait. Confused. Yeah. Two years. September 20.

00:01:27.470 --> 00:01:32.150

WU, Xiaopei [Student]

So you had left Phillip Lim. Was it right before?

00:01:31.780 --> 00:01:32.340

Interviewee 2

Mm-hmm.

00:01:33.270 --> 00:01:33.670

Interviewee 2

Yeah.

00:01:34.260 --> 00:01:36.910

WU, Xiaopei [Student]

Got it, got it. Do you like it so far like overall?

00:01:36.790 --> 00:01:58.900

Interviewee 2

I love it. Yeah, I love it. It's really. It's really good. It's it's a really nice place to work. People are very young down to Earth and nice and easy to talk to. No cattiness, no. Like, you know, backstabbing. No, it's really it's. It's actually. I think it's the first time I can truly say this is a I love going to work. This is a great place to work.

00:01:59.000 --> 00:02:06.070

WU, Xiaopei [Student]

Ohh, I'm so glad for you. That's pretty here. OK. And it's like on the smaller side like more tight knit sort of.

00:02:08.430 --> 00:02:20.050

Interviewee 2

Yeah, especially, I mean, yeah, there are some parts are in China they so. So it's partially Chinese owned the company. So they owned their own factory in Chantal.

00:02:21.180 --> 00:02:21.770

Interviewee 2

And.

00:02:22.950 --> 00:02:24.610

Interviewee 2

So a lot of a lot of.

00:02:24.940 --> 00:02:45.670

Interviewee 2

Umm. Part like parts of the production and even a little bit of like like the administrative side is done and in China so it's split but here it's very small like the design team is very small. There's just me on the knits team really. And then I have two technical designers that are also doing a lot of product development.

00:02:46.190 --> 00:02:52.730

WU, Xiaopei [Student]

Gotcha. OK. OK. Sounds great. OK, well, my first question is.

00:02:53.640 --> 00:03:02.240

WU, Xiaopei [Student]

Uh, I'll just read it out. So what do you know about how artificial intelligence is being used in the fashion industry, if anything?

00:03:05.080 --> 00:03:08.590

WU, Xiaopei [Student]

Like what have you heard or what do you know, or even in your own experience, yeah.

00:03:06.630 --> 00:03:07.060

Interviewee 2

After.

00:03:09.330 --> 00:03:18.100

Interviewee 2

I mean, I've heard of it. I've heard of uh, even programs that are designing artificial intelligence that actually designs. I have not experienced that myself.

00:03:20.650 --> 00:03:25.680

Interviewee 2

Yeah, actually, I mean, I've never really worked with AI in my in my career.

00:03:27.040 --> 00:03:28.960

Interviewee 2

I really just heard of it. Umm.

00:03:28.650 --> 00:03:35.510

WU, Xiaopei [Student]

Right, right. That sounds quite typical. Or how I've heard from most people share that way now.

00:03:37.110 --> 00:03:42.940

WU, Xiaopei [Student]

So, since you haven't this was heard that much about it, uh, how would you see it?

00:03:44.100 --> 00:03:57.510

WU, Xiaopei [Student]

Facilitating the creative design process, possibly in the future or like if you can, based on what you've heard of its capabilities, could you see it contributing to the creative design process like you're at process is a designer.

00:03:59.890 --> 00:04:05.780

Interviewee 2

I I mean, I don't know. That's it's such a difficult question because AI to me is a bit scary too, I mean.

00:04:06.280 --> 00:04:06.550

WU, Xiaopei [Student]

Yeah.

00:04:08.710 --> 00:04:12.730

Interviewee 2

It's a philosophical question too. In the end. Right? And it's like no limits to it.

00:04:16.040 --> 00:04:20.380

Interviewee 2

I mean, of course we could benefit benefit from it in the design process also.

00:04:23.210 --> 00:04:24.300

Interviewee 2

Like even just like.

00:04:25.350 --> 00:04:41.720

Interviewee 2

Pull analysis from past histories like once, like if and if a program could actually identify what are the strong the key elements of a design, what was what, what was it that was working so well for something. And then you know like filter those out.

00:04:42.560 --> 00:04:51.610

Interviewee 2

And not necessarily put it together and then you design, but at least just like highlight them and just really pull all that history from past.

00:04:52.320 --> 00:04:58.050

Interviewee 2

From past really commercial sales, something like that. I I could see or colors too.

00:04:54.940 --> 00:04:55.220

WU, Xiaopei [Student]

Mm-hmm.

00:04:59.080 --> 00:05:01.440

Interviewee 2

Something like that I think could be beneficiary.

00:05:03.560 --> 00:05:18.650

WU, Xiaopei [Student]

What about things like that you are using now in terms of not so much pure artificial intelligence, but more so like computer aided design, virtual sampling, a lot of the, I suppose developments that have been.

00:05:20.510 --> 00:05:28.210

WU, Xiaopei [Student]

Growing a lot more because of, you know, what's in the past three years because of the pandemic. How has that influenced how you work now?

00:05:25.700 --> 00:05:26.150

Interviewee 2

Mm-hmm.

00:05:29.160 --> 00:05:30.230

WU, Xiaopei [Student]

Those kind of programs.

00:05:31.460 --> 00:05:34.730

WU, Xiaopei [Student]

Or in your current company or or has it not?

00:05:31.560 --> 00:05:32.060

Interviewee 2

Umm.

00:05:35.880 --> 00:05:50.490

Interviewee 2

Well, they are doing a little bit of three design already. They have one person that is that's that is working with that and I think it's mostly to to look at Prince Placement and such in the Network World. We're not really using it. I mean we do work a lot with.

00:05:52.160 --> 00:06:01.890

Interviewee 2

We're now like everything is connected. Everything is in, is like an on and online server and everything goes through teams. We work like most of our meetings, are virtual still.

00:06:02.730 --> 00:06:06.320

Interviewee 2

So. So in that sense, we do use, we do use a lot of.

00:06:07.100 --> 00:06:15.190

Interviewee 2

Umm. Programs but like new programs. In that sense, it's still for us. It's still Adobe Creative suite and.

00:06:16.270 --> 00:06:17.930

Interviewee 2

A lot is done by hand also.

00:06:19.070 --> 00:06:38.100

WU, Xiaopei [Student]

OK. So can you describe like now your process, at least compared to how I how what we did at Tori cause obviously that's the one I'm familiar with and I don't actually even know how much it's evolved since then, like in day to day. So like would you say it's quite similar just in terms of like?

00:06:38.180 --> 00:06:58.150

WU, Xiaopei [Student]

Umm, when you start the like nitain development, things like that sending tech packs is all that very similar like does it look quite this quite. I mean apart from the fact that you're doing stuff on zoom meetings, things like that, interaction is different, but like the actual process parts, do they kind of resemble the same thing as they did. You know, when we were working together.

00:06:49.150 --> 00:06:49.540

Interviewee 2

Yeah.

00:06:58.740 --> 00:07:14.690

Interviewee 2

In general, yes. In general the process is the same like you started off with sketching by hand. Well, you start off with, you know, sourcing the yarns, working on swatches, hands, sketches, then then you would have to do cats by illustrator.

00:07:16.640 --> 00:07:21.590

Interviewee 2

At least we as well in the next team. We do that on the Roman side. It's all done by hand, but we do that.

00:07:22.230 --> 00:07:37.400

Interviewee 2

And then you put it all the information into a tech pack. We put everything into Excel tech packs. I mean, there is differences from how we do that, like the whole tech packing and how we work with the program. So what was it that awful program we had a tutorial, what was it called, PLM.

00:07:31.080 --> 00:07:31.530

WU, Xiaopei [Student]

Of course.

00:07:38.490 --> 00:07:40.820

WU, Xiaopei [Student]

Ohh. He had PM the Orange one.

00:07:39.480 --> 00:07:40.180

Interviewee 2

Hello.

00:07:41.110 --> 00:07:41.840

Interviewee 2

Uh, yeah.

00:07:41.830 --> 00:07:45.990

WU, Xiaopei [Student]

That they work, they had a whole team work on it. It was never like good enough.

00:07:46.690 --> 00:08:01.740

Interviewee 2

It was the lawful, so we we don't have to touch that. We have something called DSL which is similar, but we don't actually have to input that much in it, especially not on Proto stage because we have our China office doing that for us.

00:08:02.480 --> 00:08:20.410

Interviewee 2

And they're events that just doing it, I think once we go to salesman samples or once it moves to production samples, not much is entered before that. We just work through Excel Tech packs and then sending them back and forth and the on the shared drive.

00:08:21.170 --> 00:08:31.340

WU, Xiaopei [Student]

OK. Have you seen any changes in terms of sampling amount? I mean, I know I will take into consideration there different companies and they have a different like SKUs and stuff, but.

00:08:32.230 --> 00:08:36.480

WU, Xiaopei [Student]

The pressure on getting samples or the need for.

00:08:37.620 --> 00:08:42.930

WU, Xiaopei [Student]

Probably your design leads to see physical samples. Is that different or similar?

00:08:44.150 --> 00:08:53.490

Interviewee 2

Uh, it's different. We're seeing much fewer samples than we did at Tori. I mean, even just for Protos, we oftentimes we only see one proto and then we go straight.

00:08:48.770 --> 00:08:49.020

WU, Xiaopei [Student]

OK.

00:08:54.450 --> 00:08:57.400

WU, Xiaopei [Student]

OK. But is it like facilitated by?

00:08:58.140 --> 00:09:02.240

WU, Xiaopei [Student]

Seeing more digitized versions of things like.

00:09:02.380 --> 00:09:02.960

Interviewee 2

No.

00:09:03.720 --> 00:09:33.470

Interviewee 2

No, we just have a we just have, we just worked very, very closely with the factory. So they're sending us pictures. They're sending us. Well, first they send us swatches and then they they would send us also pictures of swatches that we could approve through just images or keep working on through images. They send us once the samples the pros are done, they put them on forms, they send us detailed pictures and specs and all of it. So a lot of times we just comment off of pictures.

00:09:33.960 --> 00:09:36.020

Interviewee 2

And then have them renet certain things.

00:09:36.750 --> 00:09:38.090

Interviewee 2

But then it's also.

00:09:39.340 --> 00:09:51.020

Interviewee 2

It's just also being like people being less fatal and being less complicated. They're just people. Just stick to the higher ups. I wanna say they just stick to more their initial wishes and and ideas.

00:09:51.700 --> 00:09:59.310

Interviewee 2

And are not changing their minds. The million times, like the collection pretty much stays as it was intended to look, you know.

00:09:59.850 --> 00:10:01.300

WU, Xiaopei [Student]

My God, what's that like?

00:10:00.230 --> 00:10:16.280

Interviewee 2

Of course we overdevelop of course we overdeveloped two. We always we were always overdeveloped. But it's not like you know how it was a tutorial you have like a huge flower story and then everything comes in and she hates everything and change it completely and we go back to doing stripes and then it's a big scramble.

00:10:17.230 --> 00:10:25.560

Interviewee 2

Do not nothing like that, and especially for knitwear also she like a creative director, really trusts our team. So she lets us.

00:10:17.510 --> 00:10:17.770

WU, Xiaopei [Student]

She.

00:10:27.040 --> 00:10:28.340

Interviewee 2

Work quite freely.

00:10:29.480 --> 00:10:49.910

Interviewee 2

Umm. And it's not like in the fittings too. It's not like being so like ANEL about everything, where we have to discuss, you know, and a half an inch here and a half an inch there. It's just like my client's too big necklance too low. So fix it and then we're gonna fix it and we're being trusted to you. So it's not like, but what are you gonna do here and why and.

00:10:50.910 --> 00:10:54.260

Interviewee 2

We also have a really good team like it's really people are very.

00:10:55.750 --> 00:11:06.780

Interviewee 2

Umm, people are very like invested in the company and really care for the product and they're they're really good at the what they're doing here and in China.

00:11:07.800 --> 00:11:12.280

Interviewee 2

So so that all helps. Like that people actually really care, you know?

00:11:12.750 --> 00:11:16.630

WU, Xiaopei [Student]

Yeah. Do you think like when you going back to when you were saying like?

00:11:17.580 --> 00:11:21.400

WU, Xiaopei [Student]

But trust thing and also like working off images. So like if you.

00:11:23.140 --> 00:11:32.950

WU, Xiaopei [Student]

Our send an image from the factory or whatnot and you guys are able to make comments or approve from that. Do you think that part of that is because like now there's this understanding that it's less?

00:11:34.060 --> 00:11:40.020

WU, Xiaopei [Student]

Convenient to send things physically anymore, and so people have kind of make do. Is there a lot of that going?

00:11:39.580 --> 00:11:58.900

Interviewee 2

Absolutely, yeah, absolutely. I mean for the past couple of seasons with everything that was going on, we were also very tight with schedule, but that's also due to COVID because so many things were delayed. We had to approve a lot of things through pictures or we couldn't send back pinned Protos, for instance. So we had to.

00:11:59.750 --> 00:12:10.230

Interviewee 2

Also, just communicate in other ways and be really specific about it, like in our explanation to them virtually.

00:12:10.920 --> 00:12:41.650

Interviewee 2

Just they couldn't actually get the samples, so definitely I think it's changed a lot. The pandemic has changed a lot the ways we work now. I haven't been at that company PREPANDEMIC, but also from what I hear from other people, it's changed immensely like before for instance, they would travel to China at least three times a year and stay for like for weeks. So they they'll be in China, have the half the year I wanna say and work with the teams there directly. And it was almost unimaginable for them that they would not.

00:12:13.650 --> 00:12:13.960

WU, Xiaopei [Student]

Which?

00:12:41.730 --> 00:12:48.120

Interviewee 2

Do that to get the collection and then they had to and they had to adapt and it's working really well also.

00:12:48.690 --> 00:12:49.990

WU, Xiaopei [Student]

OK. That's like really.

00:12:49.330 --> 00:12:50.540

Interviewee 2

Most definitely changed.

00:12:51.120 --> 00:12:56.720

WU, Xiaopei [Student]

Yeah. Do you do your tech designers use things like Clow or bronzeware?

00:12:57.880 --> 00:13:05.530

WU, Xiaopei [Student]

Browse like the yeah, the virtual sampling programs. Do they use that for making? Yeah. OK, I was just.

00:12:58.080 --> 00:12:59.210

Interviewee 2

The tech designers.

00:13:03.220 --> 00:13:03.840

Interviewee 2

No, I.

00:13:05.000 --> 00:13:13.030

Interviewee 2

Umm, I don't know if they're using it on in the production on production for grading and such, I don't know, but my tech team doesn't use it.

00:13:11.450 --> 00:13:11.900

WU, Xiaopei [Student]

Yeah, yeah.

00:13:13.600 --> 00:13:14.670

WU, Xiaopei [Student]

OK. Gotcha.

00:13:14.490 --> 00:13:18.620

Interviewee 2

They also are not doing the grading. For instance, that's all done by overseas.

00:13:19.410 --> 00:13:27.810

WU, Xiaopei [Student]

OK, got it. Got it. Umm and then just the last part I'm gonna share with you like little chart.

00:13:35.350 --> 00:13:38.460

WU, Xiaopei [Student]

So I'm assuming you can see like the shared screen, right?

00:13:38.990 --> 00:13:39.350

Interviewee 2

Yep.

00:13:39.920 --> 00:13:45.710

WU, Xiaopei [Student]

Yeah. So I'm just gonna give you a hypothetical imaginary type of like program that like.

00:13:46.400 --> 00:13:53.270

WU, Xiaopei [Student]

And I kind of want to get your feedback on it. Right. So like if say, there was a program that like.

00:13:53.600 --> 00:14:10.550

WU, Xiaopei [Student]

Umm, so AI based right that you would be able to give attributes like specify things like as a designer as a network design you were able to specify things like the inspiration images and then kind of what kind of stitch you're looking for or what kind of.

00:13:56.440 --> 00:13:56.970

Interviewee 2

Mm-hmm.

00:14:11.580 --> 00:14:43.360

WU, Xiaopei [Student]

Style. What kind of yarns or texture? Heavy gauge, whatever. Right. Kind of giving those basic attributes. And then for the computer to be able to generate these swatches right. And one reason why the doing the survey could have been helpful beforehand is that in this survey, there's actually images of different swatches, right? And some of them are, they're all computer. Well, not all half of them are computer generated. Right. And so the idea is that like, if there was this capability for program to develop these digital swatches.

00:14:16.080 --> 00:14:16.460

Interviewee 2

Mm-hmm.

00:14:43.870 --> 00:15:12.020

WU, Xiaopei [Student]

Right. And for those watches to be able to be applied in like a virtual kind of design software where you can experiment with them on bodies, right? So kind of and then for it to go directly into either like sampling or for the program itself to suggest suitable yarns to meet the specifications, right? So do you think do you see something like this like very far off or?

00:14:43.880 --> 00:14:44.300

Interviewee 2

Mm-hmm.

00:15:12.700 --> 00:15:22.010

WU, Xiaopei [Student]

Like, is it something that you can see is being helpful to designers in terms of like creativity in terms of like efficiency and in terms of just?

00:15:24.650 --> 00:15:30.850

WU, Xiaopei [Student]

I suppose like end product quality. Yeah. Is this something? And this is all, like, hypothetical. Sort of, yeah.

00:15:31.750 --> 00:15:37.760

Interviewee 2

I mean, I maybe I'm a little old fashioned, but I don't think something like that can really replace the.

00:15:38.860 --> 00:16:07.240

Interviewee 2

The the human designer in this because I guess it can tell you the suitable suitable yarns and all of that, so it might be you know it might be a support, it might be helpful for an initial like just the direction if you're completely lost then you don't know where to look for, but it definitely takes I think it takes the fun out of it. It takes the passion out of it and it loses all the the appeal of what fashion is in the 1st place. Is it good to create garments? Yes. I think it's probably good to create clothing.

00:16:08.080 --> 00:16:17.800

Interviewee 2

You're probably going to get, you know, wearable clothing out of it, but I don't think it's. It's probably gonna be hit or miss. Maybe sometimes things come out in their amazing like with everything.

00:16:08.300 --> 00:16:08.560

WU, Xiaopei [Student]

Mm-hmm.

00:16:19.100 --> 00:16:29.250

Interviewee 2

But I I I I see it as a bit, although I'm I know they these programs are very sophisticated and they're getting better and better, but I think it's probably gonna be a little bit random.

00:16:30.330 --> 00:16:32.250

WU, Xiaopei [Student]

Yeah. No, I think that's like really.

00:16:32.990 --> 00:16:42.440

WU, Xiaopei [Student]

Great feedback to hear. Also the nuance that like what you were saying and loses that passion or that human intent in it. I think what you were saying is really.

00:16:44.010 --> 00:16:47.180

WU, Xiaopei [Student]

Both like good to hear and important. Yeah, but do you like?

00:16:46.500 --> 00:17:00.510

Interviewee 2

Yeah, especially with knitwear, where you really have to go in and it's like you have to study it and you have to envision it, you have to. It's just like, making stuff up all the time. You have no idea how it's gonna look like if you would. The way it's two yarns are combined in a certain stitch. So.

00:17:02.040 --> 00:17:12.600

Interviewee 2

So sometimes you just gotta do the try the unexpected, make combinations that you know. Maybe you wouldn't really do otherwise, and that's how you get that great, exciting novelty.

00:17:14.690 --> 00:17:15.420

WU, Xiaopei [Student]

So.

00:17:16.430 --> 00:17:24.400

WU, Xiaopei [Student]

Just in general, right, like in your design process, right? Where do you think like the pain points are in terms of process?

00:17:26.500 --> 00:17:28.650

WU, Xiaopei [Student]

Well, that's the first part of the question. The second part is like.

00:17:29.590 --> 00:17:33.160

WU, Xiaopei [Student]

What do you think technology can do to help that those pain points?

00:17:33.950 --> 00:17:45.300

WU, Xiaopei [Student]

Kind of like an example. I'm thinking back to like how PDM was supposed to help as a system, but PDM didn't like. I mean, it helps some ways. But in so many ways, it was felt very.

00:17:39.790 --> 00:17:40.350

Interviewee 2

Mm-hmm.

00:17:46.930 --> 00:17:56.960

WU, Xiaopei [Student]

It like took more time for like the uploading of tech back. Whatever it was right, it was just like, yeah. So in a similar way like currently and how you work, what do you feel like our pain points and then?

00:17:50.420 --> 00:17:50.770

Interviewee 2

Yeah.

00:17:57.950 --> 00:18:03.150

WU, Xiaopei [Student]

How can you see those pain points? Maybe being helped by technology? Yeah, or like.

00:18:03.320 --> 00:18:19.480

Interviewee 2

Well, well, I I do feel like a program like PDM and that what we have DSL, whatever is really is good to have. And it's important because it is where you store all your present past information and you can sort it in different ways and you can.

00:18:20.140 --> 00:18:24.090

Interviewee 2

You can, you know, look up different information.

00:18:25.390 --> 00:18:33.900

Interviewee 2

Whereas otherwise you'll save everything on a server, on a computer or in binders and folders. So I think you do need to have something like that. It's definitely support, it's just.

00:18:35.310 --> 00:18:43.790

Interviewee 2

Or most of the time, oftentimes these programs are so complicated and just not user friendly like it was with Ren PLM.

00:18:44.540 --> 00:19:10.470

Interviewee 2

Maybe it was also the way it was set up in the company where different people had different authorizations to enter information. You have to wait for person A to enter something, so you could change your information and the denomination of stuff. And I was just there. It was, you know, I I think it could have been. I'm sure there is something that's easier out there, although everybody complaints about their systems. I forgot what we had that Phillip, I didn't have anything to do with that either. Really. I have forgot what it was there.

00:19:11.660 --> 00:19:13.480

Interviewee 2

Something similar it was also.

00:19:14.180 --> 00:19:15.400

Interviewee 2

Complained about.

00:19:15.970 --> 00:19:16.710

WU, Xiaopei [Student]

OK. Gotcha.

00:19:16.720 --> 00:19:22.090

Interviewee 2

But I I do think it's something like that is needed, though I think it's good to have.

00:19:23.730 --> 00:19:25.750

WU, Xiaopei [Student]

Like it would basically, I feel like.

00:19:28.380 --> 00:19:43.090

WU, Xiaopei [Student]

Something that can allow you like a designer to have more time to be creative, right? I think that's like the right. And so how does something like a technology facilitate that, but not necessarily replace your work or you replace your creativity?

00:19:34.560 --> 00:19:35.050

Interviewee 2

Yeah.

00:19:45.030 --> 00:19:46.590

WU, Xiaopei [Student]

So yeah, it's.

00:19:47.340 --> 00:19:51.170

Interviewee 2

I think something that helps with organization for sure is a good thing to have.

00:19:47.380 --> 00:19:47.740

WU, Xiaopei [Student]

I feel like.

00:19:52.090 --> 00:19:54.940

WU, Xiaopei [Student]

Hmm OK like admin admin easy stuff.

00:19:55.420 --> 00:19:59.390

Interviewee 2

Yeah, I sort your yard and sort your colors.

00:20:00.180 --> 00:20:01.310

WU, Xiaopei [Student]

OK, got you got.

00:20:00.850 --> 00:20:04.650

Interviewee 2

Your tech packs by season. All of that, then there's Gage.

00:20:08.360 --> 00:20:08.650

WU, Xiaopei [Student]

What?

00:20:08.370 --> 00:20:14.520

Interviewee 2

That's definitely super helpful, but the designing the creative part of it for now I'm I'm a little on defense and I find it a little.

00:20:15.220 --> 00:20:19.970

Interviewee 2

It's with everything when and you when artificial intelligence takes over emotions, right? That's a bit.

00:20:22.270 --> 00:20:29.350

Interviewee 2

I know it's happening. I know it's out there, but it's a bit scary and automatable. They'll for me personally.

00:20:28.260 --> 00:20:35.770

WU, Xiaopei [Student]

Yeah, yeah, I know. It's like, I know ironic asking you to do something about it, right? I totally understand that irony. But what? What about in terms of?

00:20:36.550 --> 00:20:49.200

WU, Xiaopei [Student]

This is, yeah, the literally the last thing. UM, when you development items, are you still going through the same like going to yarn shows things like that. I mean assuming not physically going to yarn shows anymore, but yeah, how is that all happening now?

00:20:49.810 --> 00:20:56.590

Interviewee 2

Yeah, I mean, this is this is the first year where we're going to PT again. Now it, yeah, it actually happens in June.

00:20:54.090 --> 00:20:56.070

WU, Xiaopei [Student]

OK, like in July?

00:20:57.780 --> 00:20:58.330

WU, Xiaopei [Student]

Nice. OK.

00:20:58.500 --> 00:21:22.460

Interviewee 2

Yeah, yeah. And then otherwise we just thought they were. They were just sending their overviews and some were sending the whole collection physical collection, but wasteful. But that's what they did. And they've also organized to come here. They've organized a or like, I guess they Italian nose center collections to their agents in in New York. And then they had a big thing called.

00:21:23.190 --> 00:21:28.040

Interviewee 2

I don't know. Feel the yarn, which I think is their organization now. Overall, the pity. Pity.

00:21:28.660 --> 00:21:31.500

Interviewee 2

Umm collab. I don't know what you call it.

00:21:32.570 --> 00:21:40.170

Interviewee 2

Anyway, they did that in Midtown. They had it twice the field, the yarn events where everyone was there and showed their collections.

00:21:40.880 --> 00:21:41.750

WU, Xiaopei [Student]

Gotcha. OK.

00:21:42.960 --> 00:21:43.540

WU, Xiaopei [Student]

Sounds good.

00:21:45.550 --> 00:21:56.940

WU, Xiaopei [Student]

That's all of the like things that I really need to ask. I think there's enough like thing, good stuff that I can gain from this. So thank you. Thanks so much for kind of like.

Interviewee 3:

00:00:00.000 --> 00:00:08.770

WU, Xiaopei [Student]

Umm, so yeah, my first question would just to for you to sort of explain your background and then your current role.

00:00:10.400 --> 00:00:16.540

Interviewee 3

And so I study fashion design and I went to FIT.

00:00:18.890 --> 00:00:20.330

Interviewee 3

That's all I get where?

00:00:22.600 --> 00:00:31.290

Interviewee 3

So up the garage Fung College. So I always see swallow designer with this current company for.

00:00:32.310 --> 00:00:35.730

Interviewee 3

Almost 10 years now, so I design.

00:00:36.630 --> 00:00:37.700

Interviewee 3

Like meant.

00:00:38.530 --> 00:00:47.000

Interviewee 3

Swaller and boys now, like contemporary or high end sweller for more for mass market and like.

00:00:48.660 --> 00:00:57.800

Interviewee 3

Like BJ's Sands, like those mass markets, so it's easy classic like.

00:00:58.800 --> 00:01:00.510

Interviewee 3

That have been sweaters.

00:01:01.150 --> 00:01:06.440

WU, Xiaopei [Student]

Understand. Yeah. So prior to the current rule or how long have you been in the current role for?

00:01:07.350 --> 00:01:09.030

Interviewee 3

10 years, almost 10 years.

00:01:08.560 --> 00:01:13.260

WU, Xiaopei [Student]

Oh wow. OK, so basically so you graduated and then you were at this company?

00:01:13.940 --> 00:01:25.380

Interviewee 3

Uh, in between. I did couple feelings like I I was. I was feelings for TSE, the Cashmere house.

00:01:18.160 --> 00:01:18.490

WU, Xiaopei [Student]

OK.

00:01:25.880 --> 00:01:27.070

WU, Xiaopei [Student]

Ohh yeah yeah, no no.

00:01:27.640 --> 00:01:40.140

Interviewee 3

Yeah, I was there for. It was stalled intern there and then they hired freelance for a couple years. It was pretty cool. They they it's woman's fuller. And they did interesting.

00:01:40.450 --> 00:01:47.900

Interviewee 3

A high end with Kashmir and then I also I also also feel and.

00:01:48.620 --> 00:02:05.560

Interviewee 3

With Jason Wu, he did Pablo region with TSE for a small capsule, so I was involved in that project because I was with TSC, so they sent me to work with and so I was like really cool. I got a little taste of.

00:02:06.460 --> 00:02:13.290

Interviewee 3

Brown way we deal like a runway and fashion show, so it was cool and then I landed this job.

00:02:14.180 --> 00:02:38.680

WU, Xiaopei [Student]

Right. Yeah. Well, so you have like, both ends. Yeah. Cause what I know of Tsz. It's very, like, luxurious. More. It feels high end. At least they marketed it that way. It's very beautiful at least when I see Umm looked at their stuff online. It's great. Alright, cool. So the first question of the interview is what do you know about artificial intelligence in being used in the fashion industry or do you know much about it?

00:02:19.850 --> 00:02:20.120

Interviewee 3

Yes.

00:02:41.140 --> 00:02:46.370

Interviewee 3

I yes, I know there's 3D councillor.

00:02:47.420 --> 00:02:59.680

WU, Xiaopei [Student]

So it's not, but even if that's, you can describe like what you would think about. Like, what do you think about when I say or like artificial intelligence in the fashion industry, you can even describe, yeah, just what you would think that means to you.

00:02:59.950 --> 00:03:01.580

Interviewee 3

OK, I would say.

00:03:02.690 --> 00:03:31.660

Interviewee 3

If I use Google to search for like OK, I'm looking into I'm I like to see a red cable sweller and then that daylight will be collected and then Google were able to sell it to a fashion company and then they analyze OK we got 10,000 here in past weeks. People searching for red cables smaller that is their trim and then maybe a four cast service.

00:03:31.880 --> 00:03:48.320

Interviewee 3

What use that data input and then be part of their forecast service? They red cable sweller is trimming next week or next season because we got a laugh with search for that through the search engine. So that's why.

00:03:49.350 --> 00:03:54.910

WU, Xiaopei [Student]

Umm, no, that's completely, uh, total. And a good example. Yeah, and I think.

00:03:55.650 --> 00:04:26.280

WU, Xiaopei [Student]

A lot of the AI technology is being used towards things like that, like recommendation and Umm, but yeah, that's a great example. OK, so I think you have a pretty good grasp and then you cuz you were about to say like computer aided design, which I suppose my second question might tie into that. Like have you seen artificial intelligence involved in the creative design process for knitwear or for any other categories because you just described it on it being involved on a more I think retail.

00:04:26.370 --> 00:04:29.970

WU, Xiaopei [Student]

Customer engagement level, but like when you think about it in the?

00:04:30.800 --> 00:04:32.380

WU, Xiaopei [Student]

Creative design process.

00:04:34.300 --> 00:04:36.890

WU, Xiaopei [Student]

Do you? Yeah. Can you relate to it in that way?

00:04:38.620 --> 00:04:44.260

Interviewee 3

Uh, OK, so I we usually go to tree show and then.

00:04:45.080 --> 00:05:05.250

Interviewee 3

She must shake. Will you go to a tree shop for swather? You want uh, spend Expo every year. And then I saw Shima shaky. Was there one year and then the sales Rep was showing me how they're able to design and then we'll be on 3D model on the monitor. So without even.

00:05:05.990 --> 00:05:08.130

Interviewee 3

To make the sample you're able to.

00:05:10.430 --> 00:05:15.850

Interviewee 3

Virtually see how it looks and fit, so that really cuts.

00:05:16.690 --> 00:05:23.870

Interviewee 3

Through cut a lot. Mellow process where you had to let the sweller to see the.

00:05:24.840 --> 00:05:36.390

Interviewee 3

On the the Swatch to see how the stitch come out on this yarn and then you have to do the filling to see how it will fit on the model so it just cut.

00:05:37.360 --> 00:05:41.160

Interviewee 3

Of that, does this whole process and that was pretty cool for me.

00:05:41.570 --> 00:05:48.170

WU, Xiaopei [Student]

Umm, so when you like experience that we've learned about that, do you feel like it's quite?

00:05:49.200 --> 00:05:56.840

WU, Xiaopei [Student]

Like, have you applied it in your current job or do you feel like it's still quite like a new thing, a very new exciting thing in the future maybe.

00:05:57.520 --> 00:06:07.670

Interviewee 3

It's it's a I I think cause all companies that is a small company so come down to budget cause.

00:06:07.110 --> 00:06:08.320

WU, Xiaopei [Student]

Ohh course course yeah.

00:06:09.060 --> 00:06:09.480

Interviewee 3

It's.

00:06:10.240 --> 00:06:34.210

Interviewee 3

Red, expensive and maybe for bigger corporation like they were able to afford and have someone specialized in that program. Just like to create those 3D virtual models for them. But our company I don't, but I do have the collio program. If you know about that it it create the IT give you the.

00:06:36.570 --> 00:06:38.650

Interviewee 3

I will say it it create the sweller.

00:06:39.400 --> 00:06:48.700

Interviewee 3

Ah, look on the screen, but like 2D so are able to apply that on my sketch. So you get the texture the stitch.

00:06:50.070 --> 00:06:53.310

Interviewee 3

Without compared to illustrator it's just flat.

00:06:54.200 --> 00:06:56.030

WU, Xiaopei [Student]

Uh-huh. So Kalido you said?

00:06:56.860 --> 00:07:00.680

Interviewee 3

Yes, I'm using the you know a lot in my eye.

00:06:57.960 --> 00:06:58.210

WU, Xiaopei [Student]

OK.

00:07:01.470 --> 00:07:27.840

Interviewee 3

And my job to create like the sketching cat so the buyer can visually see how the stitch will look and how like when when it's 12 gauge it will create a final gauge like illusion and with chunk will create that chunky and then it will give you the cable stitch like so that's why why I have.

00:07:29.080 --> 00:07:41.550

WU, Xiaopei [Student]

Right. Yeah. So I've heard great things about Toledo. So when you used it in this company, did you start using it? Like when did you start using that and in the process to show people like a virtual representation of the sweater?

00:07:42.470 --> 00:07:58.150

Interviewee 3

Uh, we we create cats with colors and and then that's how we show the buyer. So instead of making sample in 10 different colors, we make one sample in one color and then the rest I will.

00:07:58.940 --> 00:08:09.120

Interviewee 3

Uh, we are able to count them out and different color. So that actually help us cut down on sampling and say there because the program.

00:08:09.650 --> 00:08:15.850

WU, Xiaopei [Student]

Right. But so when you use that program, did you use it like how many years have you used that program for?

00:08:15.610 --> 00:08:17.910

Interviewee 3

Oh uh, I think.

00:08:19.050 --> 00:08:21.540

Interviewee 3

When I was in FIT, they thought this program.

00:08:22.780 --> 00:08:24.000

WU, Xiaopei [Student]

OK, got it.

00:08:27.120 --> 00:08:44.410

Interviewee 3

And then the company already had this program before. I was hiring cause cause I know this program so well when I was in college because I learned about it and then that's why it got higher and then just using it for more than 10 years now.

00:08:44.920 --> 00:08:55.490

WU, Xiaopei [Student]

Ohh great. OK yeah, I didn't know it had such a long history. I I thought it was a a little bit of more recent thing. And do you find that I'm sure it's improved over years, but do you find that it's?

00:08:56.670 --> 00:08:59.850

WU, Xiaopei [Student]

Clear enough to portray to the buyers.

00:09:01.040 --> 00:09:01.340

Interviewee 3

Umm.

00:09:02.100 --> 00:09:09.100

WU, Xiaopei [Student]

You still. So yeah. What do you think is like, what are the problematic areas of do you think there's still?

00:09:10.480 --> 00:09:20.380

Interviewee 3

Yeah, it's definitely still looks too deep. It still flat, it's able to create the texture light. The survey that you send to me with the image of the swatches.

00:09:21.100 --> 00:09:24.600

Interviewee 3

Uh, not exactly like that, but close.

00:09:25.730 --> 00:09:26.410

Interviewee 3

Assume.

00:09:25.760 --> 00:09:27.860

WU, Xiaopei [Student]

Yeah, I know. You. Yeah. Oh, go on. Sorry.

00:09:28.080 --> 00:09:28.290

Interviewee 3

OK.

00:09:29.710 --> 00:09:36.820

Interviewee 3

So it it's definitely not like to do it T it's model like the program that I saw.

00:09:36.890 --> 00:09:39.470

Interviewee 3

It's a fun shimasaki.

00:09:40.150 --> 00:09:45.950

WU, Xiaopei [Student]

I see. OK. So yeah, I think you will. You mean like for example, in this survey, there's like some.

00:09:46.690 --> 00:09:56.140

WU, Xiaopei [Student]

Virtual renderings of the garment, and it looks like it's just looks like a picture, like flat on the on the garment. OK. Yeah. See what you.

00:09:57.360 --> 00:10:02.350

Interviewee 3

I don't know what program do you use for tap. It's not closed but similar.

00:10:04.950 --> 00:10:14.960

WU, Xiaopei [Student]

Got it. OK. Yeah. UM, no, it's been really helpful that you shared your experience with that program as well. So do you think that using?

00:10:17.250 --> 00:10:22.130

WU, Xiaopei [Student]

Elements of like UM, computer programs such as Kaleido.

00:10:24.050 --> 00:10:37.960

WU, Xiaopei [Student]

Has it helped you be more creative? UM and or has it helped you? Well, three things. Has it helped your creativity? Has it helped your work efficiency and do you think it's helped make the product?

00:10:39.320 --> 00:10:40.730

WU, Xiaopei [Student]

More sellable in the end.

00:10:41.440 --> 00:10:42.340

WU, Xiaopei [Student]

Those three aspects.

00:10:42.870 --> 00:10:44.160

Interviewee 3

Yes, for sure.

00:10:44.890 --> 00:10:45.490

Interviewee 3

That's it's.

00:10:44.920 --> 00:10:45.240

WU, Xiaopei [Student]

OK.

00:10:46.380 --> 00:10:59.140

Interviewee 3

Yeah. Yes, it's not cheap, but it's because it's helping us in all that you just mentioned so that the companies continue to pay for the program to and yeah, so yes.

00:10:58.740 --> 00:11:00.490

WU, Xiaopei [Student]

Ohh, got it. Got it. Got it.

00:11:01.320 --> 00:11:07.040

WU, Xiaopei [Student]

OK. And then what about in terms of if we're talking about true like artificial intelligence?

00:11:07.720 --> 00:11:11.690

WU, Xiaopei [Student]

Being incorporated into such a program, for example.

00:11:13.250 --> 00:11:15.820

WU, Xiaopei [Student]

To be able to create some if you need.

00:11:16.800 --> 00:11:20.700

WU, Xiaopei [Student]

Knit down options for example or Swatch options. UM.

00:11:21.380 --> 00:11:25.340

WU, Xiaopei [Student]

The potential for a computer program to let's say like.

00:11:26.070 --> 00:11:41.820

WU, Xiaopei [Student]

Give you some creative options that are new that you can choose from. Do you feel like that's something that kind of is not necessary in the process because like the in the way you work, you don't need that sort of thing like you can come up with things or. Yeah, what? What do you think about that?

00:11:45.300 --> 00:11:59.910

Interviewee 3

I I'm it would be helpful when I need to create new layout, but in turn of New Yan I I think Yong you really had to touch it to feel.

00:12:00.920 --> 00:12:10.020

Interviewee 3

Like the soft is it spongy? Is it dry? Is it stiff like dot? I think hand feel it's hard to do that.

00:12:11.130 --> 00:12:20.380

Interviewee 3

But then when I create layout I guess I think the program is able to help you to play around. OK, I wanna do a chunky cable. How would that look?

00:12:21.020 --> 00:12:30.650

Interviewee 3

And then add a couple of ribs added some texture stitch and then to to play around the layout, but then handfield I don't think the program is able to to like.

00:12:31.550 --> 00:12:37.570

Interviewee 3

You really had to touch it, so that's why we even though we cutting down on sample.

00:12:38.320 --> 00:12:54.290

Interviewee 3

But we still have uh swatches cause fires. They want to feel how the samples gonna feel. We have Swatch so they can touch. It's something about sweller. You have to touch it. It's like you can't. How touching it.

00:12:54.720 --> 00:12:58.360

WU, Xiaopei [Student]

Of course. Totally. Yeah. I definitely feel strongly about, like.

00:12:59.760 --> 00:13:01.670

WU, Xiaopei [Student]

The hand fill element as well so.

00:13:03.380 --> 00:13:22.750

WU, Xiaopei [Student]

Do you? So I'm curious though, like during that process because UMA bear for example mentioned yesterday that you also are able to sell off cats. And I think you described it like you would have one sample and then you would have cads of the different color ways, for example, right? But what about prior to that garment?

00:13:25.120 --> 00:13:42.560

WU, Xiaopei [Student]

Prior to that sample, right, so when you're just developing, starting off with sketches, creative process, do you have to development it down 1st right I'm assuming or if you don't have physical knit downs, do you go into just designing with like virtual digital?

00:13:43.970 --> 00:13:44.390

Interviewee 3

Mm-hmm.

00:13:47.260 --> 00:13:55.570

Interviewee 3

So before I start doing my design, I would have the Swatch of which Yong that I'm gonna use.

00:13:56.380 --> 00:14:13.450

Interviewee 3

Like for being cotton blend you want for this style, so I I have a physical Swatch so that I can touch and feel like the hand feel the tension like starts like before and then I will start designing into.

00:14:14.420 --> 00:14:17.830

Interviewee 3

Ah, it's style. A silhouette or stitch.

00:14:18.560 --> 00:14:23.150

Interviewee 3

Into the shock of base of the hand feel and quality of.

00:14:24.230 --> 00:14:29.530

Interviewee 3

The Swatch and then we would get a actual sample.

00:14:30.870 --> 00:14:44.540

Interviewee 3

Make and you're done, but most of the time at your sample so that we can see the weight because we it's also important for us in price because it's heavy, the price go up so so.

00:14:46.360 --> 00:14:51.840

WU, Xiaopei [Student]

So that need that you're talking about, uh, usually. Are they coming from, for example, just the yarn cards?

00:14:52.580 --> 00:14:57.980

WU, Xiaopei [Student]

Or like from the mills or are you developing them from scratch? Those knit down, yeah.

00:14:58.160 --> 00:15:01.970

Interviewee 3

You see a agent, they were source.

00:15:02.900 --> 00:15:07.570

Interviewee 3

They will contact the Yamil and then the Yammer will send them like a Jersey Swatch.

00:15:08.550 --> 00:15:09.200

Interviewee 3

And then.

00:15:10.080 --> 00:15:10.790

Interviewee 3

We just go off.

00:15:11.430 --> 00:15:24.960

Interviewee 3

We don't really tell them what to like. Give me a Swatch that's like 50 and 50% Poly acid. Now they actually send us what they have and then that's your price range.

00:15:25.780 --> 00:15:35.280

WU, Xiaopei [Student]

I see. Yeah. Yeah, I see you're saying so you. It's like they give you options or the supplier will give you those options versus you designing into them. Well, I suppose I think.

00:15:36.320 --> 00:15:48.470

WU, Xiaopei [Student]

It's probably partly because, Umm, since you were saying you're describing the styles that you are designing, if there's the men who are there more classic and there's not too much craziness in the stitch right, I'm assuming it's like mostly.

00:15:52.030 --> 00:16:06.160

WU, Xiaopei [Student]

More based. Yeah. Yeah, for at least suitable basically suitable for your typical minds where classic Mens wear. OK, OK, I understand. Thank you for sharing. And then just the last, the last part of this interview. I'm just gonna share with you.

00:16:07.290 --> 00:16:10.880

WU, Xiaopei [Student]

Uh quick diagram.

00:16:12.850 --> 00:16:27.220

WU, Xiaopei [Student]

So in this example, I'm just going to describe a hypothetical example, right and just I wanna get sort of your input for it. So like if there was this capability and the computer to be able to.

00:16:20.050 --> 00:16:20.390

Interviewee 3

Mm-hmm.

00:16:29.360 --> 00:17:00.870

WU, Xiaopei [Student]

And by the way, this could be used by for example a designer, or it could be used by say the the supplier, the mill, right? So it could be, doesn't really have to be used by the designer, but just as an example, this program as able to you're give it attributes, so you specify for example, oh, I'm looking to develop something that's like a chunky gauge, right, that has a matte texture yarn, and then it's inspired, you know, the collection I wanted to be inspired by, you know, these images. And if you're able to put those that information into a computer.

00:17:01.120 --> 00:17:07.320

WU, Xiaopei [Student]

And for that computer to be able to generate using, you know, artificial intelligence, right, based on it being trained and learning?

00:17:08.480 --> 00:17:21.320

WU, Xiaopei [Student]

It to generate creative stitches like different stitches or images, images of stitches that are related to what you specify right, and then those stitches that can be applied.

00:17:22.890 --> 00:17:36.560

WU, Xiaopei [Student]

UM, well, they can go straight to knit down form, right? So like a milk could potentially use them as ways to develop different knit down stitches, but it could also maybe like for a designer if they wanna go directly into putting on a virtual.

00:17:37.520 --> 00:17:43.880

WU, Xiaopei [Student]

Uh design, model and then sort of like, uh, trialing experimenting with the look there.

00:17:44.550 --> 00:17:59.080

WU, Xiaopei [Student]

Like over here and then potentially sampling after that, but then using these digital images as a reference for the factory to go off of to develop the actual physical sample. So in something like this, do you think it is a little bit?

00:18:00.140 --> 00:18:10.670

WU, Xiaopei [Student]

Not helpful like for the creative process. Do you or do you think there are some potential in it? And if you do like what aspects of it do you think could be helpful and what aspects do you think are kind of like pointless in a way?

00:18:12.410 --> 00:18:32.100

Interviewee 3

On wait. So if you talk about high end fashion house, I think this would be super helpful cause every season they have it. Then they have like looks and I think this whole process will works really well for high end fashion. What they do is more.

00:18:32.720 --> 00:18:34.930

Interviewee 3

Play uh. Specialize in small.

00:18:36.670 --> 00:18:42.500

Interviewee 3

Couple pieces of where that site, the valve the show stopper but.

00:18:43.150 --> 00:18:45.880

Interviewee 3

For like mass market on.

00:18:46.850 --> 00:18:47.730

Interviewee 3

I.

00:18:48.380 --> 00:18:51.350

Interviewee 3

Think it will be half half the 1st.

00:18:52.380 --> 00:19:03.980

Interviewee 3

One the first force, first three steps will be extremely helpful for the Yong Meal, where they try to sell you the yawns, and then sometimes I'll get a like.

00:19:04.800 --> 00:19:28.400

Interviewee 3

Uh forecasts book fun Yamil where they create stitches and inspiration and just showing designer as ways hey this jawn you can do in this stage and then you can do in this color and then we have sketches and you can do in this body like it kind of inspires us, OK.

00:19:29.100 --> 00:19:39.310

Interviewee 3

Maybe we can use this Yan to do these and fit my brain. And then the last physical sample, I guess that would be the designer who.

00:19:40.220 --> 00:19:53.520

Interviewee 3

We see the Inspiration Fund your meal and then we will say ohh I'd like to Swatch and like this Yan, I'll send it to factory and can you make me a cool that in this dish and this Yan and then I guess that.

00:19:54.300 --> 00:19:56.510

Interviewee 3

That's what my that's my.

00:19:57.090 --> 00:19:59.800

WU, Xiaopei [Student]

Umm yeah. No, totally. That totally makes sense.

00:20:18.190 --> 00:20:20.220

WU, Xiaopei [Student]

Great. Yeah. I think it's been.

00:20:22.650 --> 00:20:26.910

WU, Xiaopei [Student]

Interesting. Especially the way that you were saying how, UM.

00:20:28.160 --> 00:20:50.970

WU, Xiaopei [Student]

There's just that difference between the like, say, a high end company, right? They're expectations, and their process might be different compared to someone who's doing something for more mass commercial scale. So I think that was really helpful to hear from you on the dating, but yeah, that's actually it. So well, the. Yeah, I think you already gave me you answered my questions really well, so.

00:20:51.850 --> 00:20:52.500

Interviewee 3

Thank you.

00:20:51.940 --> 00:20:55.350

WU, Xiaopei [Student]

It's like it's session. Yeah. Thank you for doing. I appreciate it.

Interviewee 4:

00:00:00.000 --> 00:00:14.020

WU, Xiaopei [Student]

Alright, cool. So the first part is just like to kind of ask you about your background, which I know your background obviously, but just to confirm, are you still doing the same role Tory that I?

00:00:15.380 --> 00:00:16.950

WU, Xiaopei [Student]

No of like the PD role.

00:00:17.970 --> 00:00:20.560

WU, Xiaopei [Student]

Director or what? OK, OK.

00:00:19.170 --> 00:00:19.370

Interviewee 4

Yeah.

00:00:20.240 --> 00:00:24.850

Interviewee 4

Yeah, director. Petty roll for ready to wear.

00:00:25.770 --> 00:00:26.650

WU, Xiaopei [Student]

OK. Gotcha.

00:00:30.770 --> 00:00:37.020

WU, Xiaopei [Student]

So the first question is how much do you know about how artificial intelligence is being used in the fashion industry?

00:00:37.830 --> 00:00:38.930

Interviewee 4

Not much, honestly.

00:00:40.610 --> 00:00:45.640

WU, Xiaopei [Student]

OK, UM and then so if not, could you see it?

00:00:46.500 --> 00:00:56.670

WU, Xiaopei [Student]

Artificial intelligence facilitating the creative design process based on what you understand of it, could you see it being a part of the creative design process? And like how? So if you could?

00:01:00.950 --> 00:01:05.980

Interviewee 4

That's like you're thinking in more like close 3D like.

00:01:07.750 --> 00:01:08.270

Interviewee 4

Uh.

00:01:07.760 --> 00:01:18.930

WU, Xiaopei [Student]

So we talk about like things like that too. So when you see or think of that is one element of it, it's more computer aided design. But even with things like that like close virtual sampling.

00:01:20.520 --> 00:01:25.910

WU, Xiaopei [Student]

We can even get into that. Like, have you seen that? Be helpful in the creative design process.

00:01:27.820 --> 00:01:38.730

Interviewee 4

So I think depends where you work and how you work. So for example like obviously our our place not successful and I don't and I don't think any.

00:01:42.090 --> 00:02:04.240

Interviewee 4

3D design, sampling, even artificial intelligence to any extent, would work in a highly creative company or a high fashion company, I think because it is so driven by sea and touch that it doesn't work. I think for a company that is more price conscious maybe or.

00:02:04.880 --> 00:02:12.350

Interviewee 4

Very like budget oriented. I do think that would work, especially in the sampling when you're using.

00:02:13.110 --> 00:02:22.280

Interviewee 4

Uh. close to sample or any of? I'm just saying clone now because that's what like comes to top of mind. But like any of like, the sampling applications that they have.

00:02:22.950 --> 00:02:29.760

Interviewee 4

I think they definitely will. And again it's quicker turn around time. You don't have to wait for like the.

00:02:30.480 --> 00:02:42.990

Interviewee 4

Three to six weeks. Lee. Time to get your sample in. You could take depending on how quick you are or how much you're doing on it. Days to see a sample, maybe a week for a whole collection to be like.

00:02:44.460 --> 00:03:03.460

Interviewee 4

Brought to life and I think depending on how good you get what these systems are, how much you utilize them, it could be from like just a flat back in front sketch to a totally 3D model. You know like video showing you the garment showing you the fluidity of the drape, the movement or whatnot, so.

00:03:04.290 --> 00:03:05.400

Interviewee 4

And that sensia.

00:03:06.530 --> 00:03:13.600

WU, Xiaopei [Student]

Going back to what you were saying in terms of, you don't think it's something that would in a company like Tori, so is that?

00:03:14.940 --> 00:03:41.790

WU, Xiaopei [Student]

Cause So what I've heard from other places that they because of pandemic, they've started to embrace it more because they were forced to in a way. So you feel like at Tory it maybe was and then they're just still very attached to like physical samples. And is it what? Yeah. Can you sort of describe, say any contrast from the past in terms of being more open to these kind of technologies or you say like Oh no.

00:03:43.100 --> 00:04:04.340

Interviewee 4

I think specifically speaking for Tory. No, because even during the pandemic, we were literally shipping samples to Connecticut to peoples homes in Jersey and New York like they were just so. And we did that. I was like Kim and I worked with the Cho person that we have or like whatever the person we have in house to like.

00:04:05.000 --> 00:04:22.470

Interviewee 4

Mock up samples in 3D and you know catch them and have them all colored up beautifully, and we still couldn't see that like we have to make. We still made full collections during the pandemic and just like ship them to peoples houses to Tori's house and was like on FaceTime be like.

00:04:37.500 --> 00:04:58.490

Interviewee 4

I was saying during the pen, even during the pandemic, we shipped samples literally everywhere to Tory personally because she wanted to see everything so she would be on FaceTime with the designers and saying I'd like this. I don't like this. This is too loose. This is too tight. That tension on this is no good. The button is no good like she was still very.

00:04:59.560 --> 00:05:29.770

Interviewee 4

And two, needing to see everything I'm wanting. So this particular company, I don't see cause we tried we capital a lot of stuff we presented it and it was just like, OK great. This is nice. When do I see the sample? So I think we're still very like especially I think being mindful of that. It is a private company or are able to do whatever you want. You don't have to answer to really aboard or shareholders. So I think she was able to do what she wants and I think she will continue to wanna act in that way.

00:05:30.380 --> 00:05:35.610

WU, Xiaopei [Student]

Got it. OK. That's really I think like interesting to hear, just different.

00:05:36.370 --> 00:05:41.930

WU, Xiaopei [Student]

Or I think I expected part of that. Do you? So you would say basically approval from?

00:05:43.270 --> 00:05:55.460

WU, Xiaopei [Student]

CAD mockup or whatever from Chloe's. Uh, like a drawing from Chloe would not is not something that is really feasible. Or you can that happens much, not even at any level.

00:05:56.670 --> 00:06:08.620

Interviewee 4

Ohh, I think maybe some levels would may be merchandising. I I feel like or maybe for like the outlet teams or they kind of know what the product looks like, but they might be just coloring it up in a different color.

00:06:10.170 --> 00:06:14.900

Interviewee 4

I think that might be feasible, but in terms of like putting it in front of Tory, no.

00:06:15.690 --> 00:06:31.290

WU, Xiaopei [Student]

OK, OK, gotcha. And then like, are they doing that? So are they still doing using close to that extent early on to mock things up or does that not happen until like later stages because it takes too much time? I mean I assume like cause you guys don't have that much time?

00:06:31.760 --> 00:06:32.130

Interviewee 4

Yeah.

00:06:32.620 --> 00:06:33.720

WU, Xiaopei [Student]

OK. Gotcha.

00:06:33.220 --> 00:06:41.060

Interviewee 4

Yeah, honestly, right now, Chloe is only utilized for pattern making a little bit and it's not even utilized properly.

00:06:42.080 --> 00:06:56.090

Interviewee 4

So I think because there's such a lack of need or wanting it that the company's not even investing that much time or resources into it because they're literally using it as a pattern system at this point.

00:06:56.610 --> 00:07:02.610

WU, Xiaopei [Student]

Gotcha. OK, great. It's really good to hear like very honest. Like what's happening in the real world thing cause?

00:07:03.560 --> 00:07:19.010

WU, Xiaopei [Student]

Yeah. UM, because they're played up a lot. I think those programs, especially when you read it on because it's like about this disruption with digital software and stuff. But yeah, I kind of figured that it's different per company. And then the last sort of part of this interview, just wanted to.

00:07:19.710 --> 00:07:26.230

WU, Xiaopei [Student]

UM, show you I'm gonna share my screen really quick and show you just this hypothetic.

00:07:26.300 --> 00:07:45.800

WU, Xiaopei [Student]

Call situation right and I kind so in a situation where you have a software, I'll just describe it. You don't have to read everything, but if you have a software where it can develop, if you give it attributes like give it some specifications like OK, I want it to be inspired by these photos I'm looking for like a type of.

00:07:48.200 --> 00:07:57.200

WU, Xiaopei [Student]

Based on so this is sweater based, right? So if you're trying to develop a virtual Swatch, right, and then you're giving it attributes like ohh should be sporty or find textured.

00:07:50.540 --> 00:07:50.920

Interviewee 4

Uh-huh.

00:07:57.710 --> 00:08:27.760

WU, Xiaopei [Student]

Umm. And then it would. The computer would be able to generate these swatches based on these kind of style descriptions that you give it right. These word descriptions and then these it would generate new kind of just from scratch. These different options that kind of adhere to it and different stitches or whatnot. And then that would be applied. You know potentially you could send that to a factory for it to be interpreted and then or you could apply it as skins on something like a virtual sampling program.

00:08:22.860 --> 00:08:23.230

Interviewee 4

Mm-hmm.

00:08:28.100 --> 00:08:38.790

WU, Xiaopei [Student]

Uh, like Chloe, do you see? And then or. I mean there's for in the extreme situations, right, that you could go straight to proto or whatnot. Do you see something like this?

00:08:40.580 --> 00:08:49.200

WU, Xiaopei [Student]

Is definitely from Troy. Gauging from what you were saying is probably definitely not a Tory, but something that has potential to help the creative design process in the future.

00:08:50.840 --> 00:09:04.550

WU, Xiaopei [Student]

Even if not at Tory, or do you feel like it's something that is still not given the way you know? Like you're saying how creatives work? It's not really what they need. Yeah or anything. Yeah, what do you.

00:09:05.010 --> 00:09:29.700

Interviewee 4

So I do think staying to Tory specific, I do think this probably could be utilized halfway. At least I don't see it being like the full cycle that I'm looking at here, but I could see it like ohh that's super interesting here on my inspiration photos and here and here it generates some swatches for you and then that being shipped off to the factory to recreate your knit downs and your swatches. I can see that.

00:09:31.660 --> 00:10:00.610

Interviewee 4

But I just don't see the last part of like the second line like going through, but in terms of do I see this? So I I kind of see this like two ways. I feel like obviously in 5-10 years there's going to be a whole new world of young designers that are now more senior. And I feel like the young designers even like when I'm looking at his, I worked on launching a brand new internal company system from PDM. We are doing, we launch PLM.

00:10:00.970 --> 00:10:29.940

Interviewee 4

And it was like, really difficult these that like, you know, the existing designers that are a little bit more senior, they're very against it. They don't want to work with it. They want to do things in Excel. They want to do things old. You know, ways that they've done it. But talking to this new group of designers that are coming out of school, they're all taking these classes in school. So I think it's because they're going. They've been brought up with this in school. They're probably the first jobs have some sort of.

00:10:31.680 --> 00:10:39.870

Interviewee 4

It programs that they have to work with that they're becoming very accustomed to this and it's like becoming a standard. So I think the older.

00:10:38.170 --> 00:10:38.630

WU, Xiaopei [Student]

Umm.

00:10:41.320 --> 00:10:54.020

Interviewee 4

This I don't know, it's just politically correct. The older generation of designers, I think they're still stuck on certain ways of doing things well. Yes, I think they're trying to be relevant and wanting to do things more sustainable or.

00:10:44.040 --> 00:10:44.290

WU, Xiaopei [Student]

It's.

00:10:54.890 --> 00:11:20.600

Interviewee 4

Utilizing technologies, I think there's still a need for like I need to see a sample because this is how I know it'll work. This is how I've been brought up. This is what makes sense to me versus the newer designers that are, you know, young in their careers, they're like, OK, this is how I work. They I think they're able to visualize things and conceptualize things differently because it was all shown to them on a screen and they would talk on a screen.

00:11:21.080 --> 00:11:29.950

WU, Xiaopei [Student]

Umm, that's a really great way, like good point, because I mean, it just makes me think of the what people have been saying in terms of.

00:11:30.940 --> 00:12:03.740

WU, Xiaopei [Student]

Like how kids nowadays in school are just exposed so much more to this whole talk about the environment and whatnot, much more than our generation and the obviously much more than the generation before us. And so yeah, just to think about it at that level, that's a really wait and then so I wanted to ask then in terms of development calendar now, because I've mostly forgotten a lot of it, the nuances. But in terms of the timing of getting samples, since you guys are still relying so much on physical samples and like swatches.

00:12:04.290 --> 00:12:10.800

WU, Xiaopei [Student]

For specifically for the knit down, uh knitwear process right in the beginning. Are they still?

00:12:12.210 --> 00:12:28.280

WU, Xiaopei [Student]

Working a similar way like they're getting kind of physical switches from mill cars, things like that or like waiting for physical swatches from factory I suppose. And then is that timing in terms of like I feel like I remember it to be, I mean it would take what a week.

00:12:29.150 --> 00:12:39.490

WU, Xiaopei [Student]

An ideal situation of nothing is delayed for something to be sent in transit and like I suppose, two weeks ish for sample making. Or yeah, can you walk me through? I don't know what it's like now. Yeah.

00:12:38.280 --> 00:12:39.570

Interviewee 4

Yeah, you're you.

00:12:40.410 --> 00:12:45.000

Interviewee 4

Yeah, so about, I mean, what the disruption of, obviously?

00:12:46.720 --> 00:13:11.570

Interviewee 4

Shipment services. Things are a little bit longer now, but ideally it should take about three to four days for something to ship and clear from, let's say, Italy to Asia less time if it's going Italy to Europe and obviously last time if the mill is in China versus shipping to China type of thing. And then to for the factories to make you an it down, usually two to three weeks.

00:13:13.570 --> 00:13:14.780

WU, Xiaopei [Student]

OK, wow.

00:13:14.710 --> 00:13:17.910

Interviewee 4

To be received and then from swatches.

00:13:18.620 --> 00:13:22.320

Interviewee 4

Your timeline is you're going for Protos.

00:13:23.210 --> 00:13:34.900

Interviewee 4

After you confirm your swatches, you have your obviously your sketch review or whatnot, and then you're doing your photos. And Protos ideally should be four to six weeks, even though we've been cranking them out sooner, but.

00:13:35.610 --> 00:13:38.120

Interviewee 4

Ideal time for a factory is four to six weeks.

00:13:40.340 --> 00:13:41.260

WU, Xiaopei [Student]

Gotcha. Gotcha.

00:13:42.540 --> 00:13:48.230

WU, Xiaopei [Student]

Wow, it seems still like? Well, I don't know why I'm like, I expect things to be faster. Not that it, I mean.

00:13:49.530 --> 00:13:51.950

Interviewee 4

So a lot of people do, but I think when they.

00:13:52.730 --> 00:14:08.350

Interviewee 4

Actually, sit down and do the work that is needed and the planning and the ranging and you know highly creative company. We change our minds 10 times before something can be returned. There's a lot of stop and go for these factories so.

00:14:09.700 --> 00:14:19.330

Interviewee 4

Can those Lee times be shorter? Yes, if you put in to work on day one, what you want and you don't touch until you receive it. But we're constantly touching it through the process, so I think.

00:14:20.280 --> 00:14:21.730

Interviewee 4

A little more time is needed.

00:14:22.810 --> 00:14:32.190

WU, Xiaopei [Student]

And then those reviews that I feel like those reviews become very time consuming too, right? The multiple uh cross functional teams have to see it. Does that still feel similar? What?

00:14:32.770 --> 00:14:32.960

Interviewee 4

Yep.

00:14:32.920 --> 00:14:50.930

WU, Xiaopei [Student]

And OK, alright. And then lastly, we'll relating to what you were saying about implementing that process, the PLM process, things like that, like support tools, digital support tools, do you feel like they help?

00:14:34.300 --> 00:14:34.630

Interviewee 4

Yeah.

00:14:51.620 --> 00:14:52.570

WU, Xiaopei [Student]

More the.

00:14:53.400 --> 00:15:03.080

WU, Xiaopei [Student]

Creativity that, like capacity to be creative, the work efficiency and like the marketability like all these three things or what mostly and.

00:15:04.020 --> 00:15:27.460

WU, Xiaopei [Student]

That also the PLM system, but also things like Chloe, just digital like systems in general. What do you think they're helping more? Are they helping? Do you think they're kind of like increasing the ability for designers to be creative or is it, is it more still hindering? Do you feel like they're still complaining a lot? I mean, so they did have a lot of feedback before with, like, it being very time consuming, right with.

00:15:27.420 --> 00:15:28.810

Interviewee 4

Mm-hmm. And I.

00:15:28.110 --> 00:15:29.610

WU, Xiaopei [Student]

Administrative parts. So like, how's that?

00:15:30.130 --> 00:15:36.690

Interviewee 4

There definitely still is that complaint to so much to the level atory that they hired.

00:15:37.520 --> 00:15:48.730

Interviewee 4

And the assistant that just does all of their PLM work because it is hindering taking away from the designer's time to sit there and be creative and sketch and.

00:15:49.650 --> 00:15:56.850

Interviewee 4

Do their inspirations and or work on the collection that's on hand. So for for sure.

00:15:58.290 --> 00:16:06.640

Interviewee 4

I think it is. And during them and I think from Tory speaking a lot of the designers that are there that are making this big.

00:16:07.500 --> 00:16:37.940

Interviewee 4

Diff are the more senior designers, so that have never really done a system, never really worked in a system. I think these younger guys are coming through like the guy that was that was hired to do the sweater stuff. He's like, yeah, I can do this quickly and then now I'm free. So now can I sketch a little bit now? Can I do some mockups? You know, now you know, so I see that they thought he was gonna be just sitting at a computer typing away line sheets and style numbers and fabrics, you know, and all that he's like, you know, I'm good. I'm done. What?

00:16:38.020 --> 00:17:11.380

Interviewee 4

What else can I do to be actually creative, you know? So I think that goes back to validating my point where the younger generation that just coming out of school, they're learning this in school. So it's a skill that they have developed from the gecko that is really not taking too much time away from them. I think they're gonna be so dependent in the future on it that it's gonna go hand in hand with their design process because it probably will cut away their time from needing to make boards of visual samples because they can probably just, if you put all your criteria in your attributes from the get go in the beginning.

00:17:12.140 --> 00:17:12.840

Interviewee 4

You can.

00:17:13.690 --> 00:17:20.680

Interviewee 4

Print out or you can generate a report to spit it out the way you want to see it. So yes, it saves you time from that.

00:17:22.720 --> 00:17:25.430

Interviewee 4

You know, manual work that you would have done before.

00:17:26.520 --> 00:17:30.270

Interviewee 4

Creating a board, a cutting swatches and cutting sketches and putting it up.

00:17:32.590 --> 00:17:48.180

WU, Xiaopei [Student]

Yeah. So interesting that even like till now, I mean even the senior people because they've been obviously working all this time. But yeah, there's a change in mindset or straying away from what was like traditional is very takes a long time or it's very hard.

00:17:47.680 --> 00:17:48.090

Interviewee 4

Yeah.

00:17:48.820 --> 00:18:05.010

Interviewee 4

Yeah. And I think from I know it's kind of, but not really likes plays a part, but sustainability because all the sample making all the shipments back and forth like that's not all that's not sustainable at all. You know especially when you drop.

00:18:06.070 --> 00:18:36.830

Interviewee 4

You have remembered that our crazy drop rates, where it's like 7080% drop rates, that's still happening you know. So I think I don't know that I ever really see that. I kind of going away because it is such a highly creative company and an addition a private company. But I do see on other parts where they're trying to do good at it. So it's like let's work on all really working out, so working with sustainable materials from the gecko. So at least that part is are we working with the factory that.

00:18:36.920 --> 00:18:40.120

Interviewee 4

That is, using sustainable practices, do they have their?

00:18:40.190 --> 00:18:50.630

Interviewee 4

GOTG certificates, like you know, do they have all these sustainability certificates? So I feel like that's a bigger push to kind of maybe a know sense offset the other side.

00:18:52.050 --> 00:19:22.780

Interviewee 4

So it's like packaging. Let's work on really reducing our packaging and throwing away all the plastics and all of the, I don't know, I don't know how you can do without the bags and like, you know clothing, but I think that's due to beef, something figured out, figuring out some sort of recyclable version or whatnot. So I think that is probably that not probably I feel like that's a big push to be like, OK, I'm not really great on this side of the spectrum with the development and utilizing all these tools, but maybe let me see what I can do on the other side to see.

00:19:23.250 --> 00:19:25.360

Interviewee 4

If the balances things a little bit.

00:19:23.320 --> 00:19:23.600

WU, Xiaopei [Student]

Umm.

00:19:26.110 --> 00:19:54.140

WU, Xiaopei [Student]

OK, so I know that like they hired, I'm sure like all companies were doing this and maybe like four years ago, they already started doing this, but hiring like sustainability teams or persons leads. So that's probably a major one. Do you see other new roles like that and you're just saying like somebody who even enters the, you know, alleviates the admin work from design someone who just app but like, yeah, all kind of levels, what other major roles are they?

00:19:54.920 --> 00:19:58.770

WU, Xiaopei [Student]

A for example, are they hiring people to do metaverse stuff?

00:20:05.140 --> 00:20:05.360

Interviewee 4

Uh.

00:20:05.420 --> 00:20:21.720

Interviewee 4

This is inability team, so the fact the company has higher, I mean that's a team of two people, but regardless there's a sustainability team within the company that are really working hard with teams to try to see what they can do. And again it's more.

00:20:23.140 --> 00:20:34.360

Interviewee 4

It's more of a push on the supply chain side than versus the design side. I think again they don't wanna touch them or hinder them from being able to do design work. But at the other end, it's pushed hard.

00:20:36.960 --> 00:20:49.250

WU, Xiaopei [Student]

Got it, got it. OK, great. That's actually, yeah. I think we had a really good little discussion. So I'm gonna just stop the I can stop recording.

Interviewee 5:

00:00:14.120 --> 00:00:22.710

WU, Xiaopei [Student]

Alright, here we go. So the first question is what do you know about how artificial intelligence is used in the fashion industry, if anything?

00:00:29.030 --> 00:00:30.880

Interviewee 5

I think my.

00:00:32.400 --> 00:00:48.310

Interviewee 5

Understanding of how artificial intelligence is used in fashion currently as a lot of the like the algorithm stuff that they're using for like marketing, but in terms of actual manufacturing.

00:00:53.040 --> 00:00:57.130

Interviewee 5

I feel like I feel like they're doing like automation and like.

00:01:01.640 --> 00:01:09.820

Interviewee 5

I feel like Puma with might have been doing something with AI that it was like an automated footwear factory, but in terms of actual.

00:01:11.810 --> 00:01:14.550

Interviewee 5

Garment manufacturing. I feel like it's still.

00:01:15.500 --> 00:01:16.460

Interviewee 5

The human touch.

00:01:17.000 --> 00:01:27.850

WU, Xiaopei [Student]

Umm yeah, I think you're absolutely correct. So I'm saying that. So it seems like also that's like what most people feel. I've spoken to as well, so.

00:01:24.910 --> 00:01:25.210

Interviewee 5

Yeah.

00:01:28.710 --> 00:01:34.420

WU, Xiaopei [Student]

Could you see it? Since you haven't like seen it? Especially like not something that's.

00:01:35.280 --> 00:01:39.770

WU, Xiaopei [Student]

Big or evident at like Tori. Do you see it?

00:01:38.190 --> 00:01:38.540

Interviewee 5

Umm.

00:01:40.420 --> 00:01:43.730

WU, Xiaopei [Student]

And the future facilitating the creative design process.

00:01:44.480 --> 00:01:50.000

WU, Xiaopei [Student]

Umm, yes. So like how so? Like, what would you see it facilitating?

00:01:52.100 --> 00:01:54.220

Interviewee 5

Possibly and like direct to consumer?

00:01:54.740 --> 00:02:09.710

Interviewee 5

Umm that could be like an application like people you know going online and you know, clicking around and cut basically doing like me to order. But in terms of more like.

00:02:11.160 --> 00:02:18.130

Interviewee 5

The matter what contemporary to like? Luxury market I I still feel like that will be.

00:02:19.810 --> 00:02:20.650

Interviewee 5

Human involved.

00:02:21.290 --> 00:02:21.630

WU, Xiaopei [Student]

OK.

00:02:22.420 --> 00:02:30.050

WU, Xiaopei [Student]

And then like in terms of your own experience with the seeing and like being part of the creative design process?

00:02:30.850 --> 00:02:31.320

WU, Xiaopei [Student]

UM.

00:02:32.370 --> 00:02:33.640

WU, Xiaopei [Student]

Do you see?

00:02:34.660 --> 00:03:03.980

WU, Xiaopei [Student]

As soon as like computational technology in general like OK, so like typical computer aided design. And like they're hits of AI happening I suppose. But when you see and this is like for example close which is a virtual design software, it's not the same necessarily AI, but when you see things like that in your current position, do you see that it's being embraced or and like how is it helping design the creative design process specifically and designer specifically or not you know?

00:02:48.790 --> 00:02:49.490

Interviewee 5

Yeah. Yep, Yep.

00:03:03.880 --> 00:03:06.130

Interviewee 5

Yeah, so it's, it's.

00:03:06.850 --> 00:03:15.090

Interviewee 5

It's funny because I can actually give you 2 examples where I'm Tori, so they tried to use Chloe.

00:03:16.440 --> 00:03:39.090

Interviewee 5

They specifically wanted to use it for like repeat styles that were coming in different, like prints to figure out print layouts for bulk and T shirts because T shirts are always the same like two or three blocks and with like a graphic on it that they would just need to like place or you know figure out the different sizes or whatever.

00:03:40.210 --> 00:03:42.040

Interviewee 5

And Cloe was.

00:03:42.790 --> 00:03:51.800

Interviewee 5

Not embraced by design, it was something that tech and production like PD were all like oh wow, we can.

00:03:52.480 --> 00:03:57.500

Interviewee 5

Save time on, you know, sampling. We cannot skip a sample around and not.

00:03:58.420 --> 00:04:04.630

Interviewee 5

As far as I know, is not being used anymore, just because the designers at the end of the day still wanna see it in person.

00:04:06.480 --> 00:04:17.590

Interviewee 5

And then, but then on the other hand, at least for sweaters, we have like a newer factory that we're working with has.

00:04:18.280 --> 00:04:22.270

Interviewee 5

It's not close, but it's 3D for sweaters.

00:04:23.710 --> 00:04:30.930

Interviewee 5

And they had sent us some renderings of, you know, this is what this is going to end up looking like.

00:04:32.200 --> 00:04:42.930

Interviewee 5

Like it was like options for like a stitch that we had. I think we had asked for a stitch that, like, wasn't actually gonna work in reality. So they sent us options of like, this is what we actually think you want.

00:04:45.070 --> 00:04:50.850

Interviewee 5

And the design team was like, Oh my God, this is amazing. We love these. Like, this is so cool. So it was like.

00:04:51.560 --> 00:04:56.450

Interviewee 5

Kind of funny that they they like in the past, like, hadn't responded to it, but then they.

00:04:57.080 --> 00:05:00.280

Interviewee 5

They did, and I don't even think it was like.

00:05:01.510 --> 00:05:03.350

Interviewee 5

I don't even know if they did like a full.

00:05:04.020 --> 00:05:09.490

Interviewee 5

Garment. They just might have rendered like a front or something like that, but it was just like to see.

00:05:10.500 --> 00:05:13.510

Interviewee 5

Get an idea for what the effect was gonna be like was.

00:05:14.640 --> 00:05:15.620

Interviewee 5

Helpful for them.

00:05:16.290 --> 00:05:16.790

Interviewee 5

Uh.

00:05:18.160 --> 00:05:27.590

Interviewee 5

I'm yeah. I'm like, I'm not exactly sure what it was about Chloe that people didn't respond to. I I feel like part of it might have been.

00:05:30.140 --> 00:05:32.900

Interviewee 5

The the like avatar.

00:05:33.560 --> 00:05:34.370

Interviewee 5

Actually.

00:05:34.930 --> 00:05:35.520

WU, Xiaopei [Student]

OK.

00:05:35.340 --> 00:05:43.970

Interviewee 5

Was the issue on because the avatar kind of was like stiff and it just looks like a mannequin like it doesn't, it doesn't look like anything.

00:05:46.060 --> 00:05:50.880

Interviewee 5

And it doesn't look like a runway model like it was based on like our actual fit model measurements.

00:05:51.920 --> 00:05:56.580

Interviewee 5

But then the 3D renderings that we had gotten for sweaters.

00:05:57.270 --> 00:05:58.260

Interviewee 5

Had no body.

00:06:01.410 --> 00:06:10.920

Interviewee 5

It was just like here is like the front of a sweater, and for whatever reason, it was like, oh, this is really neat. Thanks for sending this, you know, and choose option whatever be.

00:06:12.090 --> 00:06:14.340

WU, Xiaopei [Student]

Wait, OK, so that's really interesting.

00:06:17.320 --> 00:06:20.410

Interviewee 5

I feel like so, honestly, I feel like so much of it was the avatar.

00:06:20.910 --> 00:06:24.490

WU, Xiaopei [Student]

OK. Well, and what program was it?

00:06:21.800 --> 00:06:22.070

Interviewee 5

Yeah.

00:06:25.730 --> 00:06:28.890

WU, Xiaopei [Student]

They're the one that they were actually embracing. Do you know what the?

00:06:28.430 --> 00:06:29.100

Interviewee 5

Yeah.

00:06:29.980 --> 00:06:31.610

Interviewee 5

I I can find out.

00:06:32.880 --> 00:06:35.330

WU, Xiaopei [Student]

Ohh yeah, could you? I'm just curious.

00:06:34.370 --> 00:06:35.570

Interviewee 5

Yeah, yeah, yeah, all out.

00:06:36.170 --> 00:06:36.700

WU, Xiaopei [Student]

Because like.

00:06:36.730 --> 00:06:42.270

Interviewee 5

Umm, because because typically with sweaters. Until I feel like I'm in the past.

00:06:43.030 --> 00:06:55.120

Interviewee 5

Year or two is when it used to always be for these programs. Ohh but that like you can't do sweaters on these 3D programs and then it's been in the past like 2 years that.

00:06:50.920 --> 00:06:51.610

WU, Xiaopei [Student]

Right, right, right.

00:06:55.920 --> 00:06:58.530

Interviewee 5

We've had, I've also had.

00:06:59.780 --> 00:07:02.750

Interviewee 5

Phoenix sent us a 3D rendering before.

00:07:05.620 --> 00:07:07.090

Interviewee 5

So yeah, I'm not like.

00:07:08.410 --> 00:07:12.230

Interviewee 5

I'm not super sure I'll I can. I'll ask what program they're using.

00:07:12.730 --> 00:07:21.690

WU, Xiaopei [Student]

OK. But like, can you describe how it looked in terms, I mean you said it wasn't on avatar, but like in terms of the stitches or like the actual sweater part of it was it?

00:07:16.720 --> 00:07:17.050

Interviewee 5

Umm.

00:07:22.570 --> 00:07:27.830

WU, Xiaopei [Student]

It did it look, UM, the digital aspect of it wasn't distracting.

00:07:26.800 --> 00:07:27.370

Interviewee 5

Yes.

00:07:28.970 --> 00:07:29.450

WU, Xiaopei [Student]

Like it was.

00:07:29.020 --> 00:07:29.560

Interviewee 5

Umm.

00:07:30.100 --> 00:07:32.360

WU, Xiaopei [Student]

Real enough for them for designers action.

00:07:30.470 --> 00:07:30.850

Interviewee 5

I don't.

00:07:31.970 --> 00:07:32.400

Interviewee 5

Yeah.

00:07:33.100 --> 00:07:35.240

Interviewee 5

I I feel like the.

00:07:36.650 --> 00:07:41.560

Interviewee 5

Because I know what you're saying about the the visual of the texture like.

00:07:42.380 --> 00:07:43.220

Interviewee 5

I feel like it.

00:07:44.480 --> 00:07:47.350

Interviewee 5

You know, it could be improved, but it wasn't.

00:07:48.060 --> 00:07:49.290

Interviewee 5

It wasn't that bad.

00:07:50.280 --> 00:07:51.410

WU, Xiaopei [Student]

OK, cool.

00:07:50.710 --> 00:07:55.190

Interviewee 5

Because I I know what you're saying. Yeah. I've seen some of, like, the earlier.

00:07:56.150 --> 00:08:03.750

Interviewee 5

Renderings like I think the first time Phoenix had sent us a rendering. They don't do them often, but occasionally they'll send US1.

00:08:08.000 --> 00:08:11.030

Interviewee 5

It was like when they first the first time they were someone I was like.

00:08:11.730 --> 00:08:20.660

Interviewee 5

This is rough, but I I get the idea, but then whatever the most recent one we got from like the newer factory we're working with was like ohh wow that looks pretty good.

00:08:21.760 --> 00:08:31.990

WU, Xiaopei [Student]

Great. OK. That's really, I haven't heard of it like in that sense. Think you're the first person to mention it also from a like the supplier sending?

00:08:26.280 --> 00:08:26.680

Interviewee 5

Yeah.

00:08:32.940 --> 00:08:46.350

WU, Xiaopei [Student]

It versus you guys, you and maybe design working on it so close currently in the company, it's like something that you guys work on the most not really designed right, they're still doing the illustrators.

00:08:44.900 --> 00:08:48.790

Interviewee 5

Yeah, design wasn't working. Yeah, design wasn't working on it at all.

00:08:50.670 --> 00:09:13.940

WU, Xiaopei [Student]

And it's something that takes. I don't actually, I don't even know how much you are using it since like, again like you're saying for sweaters, not a lot of it can be accommodated. But like if you have or like if you've seen your other coworkers use it, then like is it something that takes a long time to actually if you're actually gonna use it and develop it into some virtual like representation, does that part take a long time?

00:08:59.500 --> 00:08:59.940

Interviewee 5

Yeah.

00:09:18.480 --> 00:09:29.790

Interviewee 5

I I feel like it's it's one of those things sort of like Photoshop or illustrator that like people who don't get the hang of it. It's going to take them forever and people who.

00:09:30.580 --> 00:09:33.100

Interviewee 5

Pick it up, get really fast at it.

00:09:35.310 --> 00:09:37.740

Interviewee 5

Like, I mean, you know, both of these people so.

00:09:38.930 --> 00:09:41.430

Interviewee 5

Or refer to them, but like shut Shelly.

00:09:43.150 --> 00:09:47.320

Interviewee 5

Yeah. Yeah, yeah, yeah, that did that does patterns.

00:09:48.970 --> 00:09:53.630

Interviewee 5

Shelly had been trained on it and Kelly correct.

00:09:54.410 --> 00:10:04.730

Interviewee 5

And Shelly is not did not pick it up that well. She's very slow at it. And but Kelly Horak got crazy fast at it.

00:10:07.100 --> 00:10:10.850

Interviewee 5

And she, like, kind of had the eye for it to like.

00:10:12.330 --> 00:10:13.940

Interviewee 5

Because it's one of those things like.

00:10:17.080 --> 00:10:21.370

Interviewee 5

You have your pattern pieces like how how they measure in real. Excuse me.

00:10:22.510 --> 00:10:24.620

Interviewee 5

Excuse me. Uh, in real life.

00:10:25.630 --> 00:10:26.450

Interviewee 5

But then when you like.

00:10:27.190 --> 00:10:28.240

Interviewee 5

Like stitch it.

00:10:28.980 --> 00:10:31.240

Interviewee 5

And you know, put it on the.

00:10:33.470 --> 00:10:36.660

Interviewee 5

Avatar person. Sometimes it doesn't look good.

00:10:38.200 --> 00:10:38.740

Interviewee 5

On.

00:10:38.430 --> 00:10:40.550

WU, Xiaopei [Student]

Got it. OK, yeah.

00:10:39.380 --> 00:10:42.850

Interviewee 5

Just bit like visually, so she kind of got the eye for.

00:10:47.170 --> 00:10:51.510

Interviewee 5

Taking the like pattern pieces and kind of like jogging it.

00:10:52.410 --> 00:10:55.800

Interviewee 5

To make it look a little bit more design friendly.

00:10:57.880 --> 00:11:02.780

Interviewee 5

Like to make it look a bit more like the designers sketch. Or you know what I mean? Like.

00:11:03.660 --> 00:11:15.800

Interviewee 5

When you, when you literally are translating it, like translating the the pattern to be 3D on the body, it doesn't look good 100% of the time.

00:11:17.420 --> 00:11:22.410

Interviewee 5

Sometimes it's why I think like AT shirt or something it's fine. But sometimes with the more like.

00:11:24.430 --> 00:11:28.250

Interviewee 5

You know, like a draped dress or something like that. She kind of have to fudge it.

00:11:28.980 --> 00:11:32.530

WU, Xiaopei [Student]

Got it. And you guys all got trained on it internally?

00:11:33.530 --> 00:11:37.480

Interviewee 5

It was only it was like a handful of people that got trained on it.

00:11:38.800 --> 00:11:40.270

Interviewee 5

But like, I wasn't trained on it.

00:11:43.730 --> 00:11:47.440

WU, Xiaopei [Student]

Like I was wondering there, well, it depends on the person, right? But like.

00:11:47.050 --> 00:11:47.310

Interviewee 5

Umm.

00:11:48.130 --> 00:11:51.510

WU, Xiaopei [Student]

It was something that you could pick up quickly enough.

00:11:51.740 --> 00:11:52.180

Interviewee 5

Yeah.

00:11:52.380 --> 00:12:03.850

WU, Xiaopei [Student]

As for me, like, I mean I I tried it as well. So I was wondering if you're using a day to day, I can see it becoming ohh basically like Photoshop or Illustrator where it's like something you just have to use. But I was just curious like yeah experience.

00:11:59.440 --> 00:11:59.970

Interviewee 5

Right.

00:12:04.030 --> 00:12:15.600

Interviewee 5

Yeah, I I think it's one of those things that like I said, it's some people. Yeah. And and maybe, you know, like a younger people that grew up with like, you know, technology and all this stuff like.

00:12:17.320 --> 00:12:18.790

Interviewee 5

Pick it up a bit quicker then.

00:12:19.740 --> 00:12:23.840

Interviewee 5

Some of the older generation I I do think that's part of it, yeah.

00:12:21.610 --> 00:12:22.860

WU, Xiaopei [Student]

Yeah, yeah, yeah, no.

00:12:23.830 --> 00:12:28.240

WU, Xiaopei [Student]

Told you. Told. OK. So the last part.

00:12:28.400 --> 00:12:33.470

WU, Xiaopei [Student]

Uh question. Last question. I'm just gonna share with you my screen really quickly.

00:12:33.030 --> 00:12:33.320

Interviewee 5

Umm.

00:12:34.790 --> 00:12:41.970

WU, Xiaopei [Student]

And so this is like a hypothetical process system, right? So I'm just gonna describe it. Ohh.

00:12:42.120 --> 00:12:52.260

Interviewee 5

Hold on. Hold on. I do wanna say one more thing about, like the 3D sweaters thing. I wish that we would use it a lot more.

00:12:53.220 --> 00:12:59.360

WU, Xiaopei [Student]

OK, wait. OK. So they're going to. Yeah. Like why you wish? Like, what do you anticipate it helping?

00:13:00.490 --> 00:13:01.400

Interviewee 5

Overdevelopment.

00:13:00.700 --> 00:13:00.960

WU, Xiaopei [Student]

But why?

00:13:02.390 --> 00:13:03.850

WU, Xiaopei [Student]

Uh-huh. Can you?

00:13:03.380 --> 00:13:04.070

Interviewee 5

Calm down.

00:13:05.290 --> 00:13:05.850

Interviewee 5

Over to.

00:13:07.990 --> 00:13:09.930

Interviewee 5

Over development.

00:13:10.460 --> 00:13:12.990

WU, Xiaopei [Student]

Can you elaborate? As in so it would?

00:13:13.730 --> 00:13:19.270

WU, Xiaopei [Student]

Reduce the time and the need for samples and so you wouldn't have to go through that whole process and whatnot.

00:13:17.160 --> 00:13:17.380

Interviewee 5

Yeah.

00:13:20.460 --> 00:13:23.130

Interviewee 5

I I I feel like for.

00:13:20.460 --> 00:13:20.890

WU, Xiaopei [Student]

Thought I.

00:13:24.300 --> 00:13:25.040

Interviewee 5

And this is.

00:13:25.700 --> 00:13:40.800

Interviewee 5

This is again like a very Tory specific answer because I I think at a company, you know, like Jake crew or meanwhile or Camonica or something like that. Like I feel like they would embrace.

00:13:41.920 --> 00:13:43.540

Interviewee 5

3D and.

00:13:44.380 --> 00:13:45.030

Interviewee 5

And.

00:13:45.760 --> 00:13:49.660

Interviewee 5

Using, you know those sorts of programs to reduce sampling.

00:13:50.920 --> 00:13:55.180

Interviewee 5

Because I think those companies really care about, you know, margins and.

00:13:56.120 --> 00:14:07.400

Interviewee 5

And and like merchandising and the the vision for what is being developed as extremely clear and add a more design, every company like a Tory.

00:14:10.480 --> 00:14:19.590

Interviewee 5

The designer level, you know, creative directors or you know, whoever the people who are making decisions don't necessarily understand.

00:14:20.710 --> 00:14:29.810

Interviewee 5

You know, they see a sketch and they see a Swatch and they don't really think about how those two things go together and.

00:14:31.790 --> 00:14:38.740

Interviewee 5

You know, I can look at a A sketch and a Swatch and be like this isn't gonna look the way your sketch looks after it's admitted at.

00:14:39.900 --> 00:14:40.490

Interviewee 5

Umm.

00:14:42.040 --> 00:14:49.120

Interviewee 5

Like they're gonna be disappointed when this photo shows up, and then it does. And yes, they're disappointed in it and I feel like.

00:14:50.740 --> 00:14:53.910

Interviewee 5

3D could possibly help reduce some of that.

00:14:56.200 --> 00:15:02.170

WU, Xiaopei [Student]

But in terms of like selling you know, selling something off a cat, having getting something off a cat.

00:14:59.880 --> 00:15:01.770

Interviewee 5

Hmm hmm.

00:15:02.940 --> 00:15:11.930

WU, Xiaopei [Student]

How far or close do you think we are for that cause I think someone else was saying that it's, you know, especially for sweaters, it's still tough.

00:15:11.500 --> 00:15:13.380

Interviewee 5

Umm, it's still tough, yeah.

00:15:12.930 --> 00:15:14.530

WU, Xiaopei [Student]

I don't know. Hasn't been dammit.

00:15:15.580 --> 00:15:19.890

WU, Xiaopei [Student]

Encourage people to embrace it more. At least be more open to it. Or what do you?

00:15:19.550 --> 00:15:24.150

Interviewee 5

That's, that is. Yeah. No, I I actually, I think you're right about COVID.

00:15:25.350 --> 00:15:33.080

Interviewee 5

I know buying off CAD has always been a little bit tough and it at least in my yeah. Yeah, nor.

00:15:38.010 --> 00:15:41.330

Interviewee 5

I like, at least in my experience, I feel like.

00:15:43.090 --> 00:15:52.440

Interviewee 5

Selling off cats is always been safe, are kind of like basic things or like repeat style that they're doing in a different pattern or whatever.

00:15:52.890 --> 00:15:55.090

WU, Xiaopei [Student]

That's the point. Yeah. Yeah, that's a yeah.

00:15:57.530 --> 00:16:00.960

Interviewee 5

But I feel like you're right, like COVID.

00:16:01.660 --> 00:16:03.510

Interviewee 5

Forced a lot more.

00:16:04.360 --> 00:16:05.390

Interviewee 5

You just have to.

00:16:06.120 --> 00:16:10.870

Interviewee 5

Trust the process. Here's a cat. This is all you're getting. Please buy this.

00:16:11.770 --> 00:16:13.790

Interviewee 5

And it worked. You know it did work.

00:16:15.350 --> 00:16:23.630

WU, Xiaopei [Student]

Wait. When you guys were in the, like, pretty during the critical time in New York, you were still getting same trying to get samples sent.

00:16:20.160 --> 00:16:21.280

Interviewee 5

Hmm hmm.

00:16:24.440 --> 00:16:24.820

Interviewee 5

Yes.

00:16:24.680 --> 00:16:25.620

WU, Xiaopei [Student]

At the time to.

00:16:26.080 --> 00:16:26.320

Interviewee 5

Yeah.

00:16:26.890 --> 00:16:33.040

WU, Xiaopei [Student]

Like whatever you if you had to work on something or fit like, did they send something to you like in your apartment?

00:16:32.640 --> 00:16:33.290

Interviewee 5

Umm.

00:16:34.730 --> 00:16:42.830

Interviewee 5

They were sending my my God, this was like, I feel like a million years ago now. So they were sending.

00:16:45.690 --> 00:17:05.630

Interviewee 5

At least for production fittings, things were being sent to Hong Kong office and Hong Kong team was fitting for us while we were on tech and design were on like teams doing a video fitting together. So basically I'm on a teams called telling.

00:17:06.330 --> 00:17:13.230

Interviewee 5

Hung like telling Donna and Hong Kong. Ohh, you know, the shoulder looks too wide. Can you like pull it in? Ohh, no, no, no. Pull it in a little bit more.

00:17:15.540 --> 00:17:16.300

Interviewee 5

And then.

00:17:17.020 --> 00:17:18.970

Interviewee 5

She would basically send me.

00:17:19.590 --> 00:17:20.060

Interviewee 5

Ah.

00:17:21.530 --> 00:17:23.630

Interviewee 5

Her like rough before and after.

00:17:24.910 --> 00:17:29.410

Interviewee 5

Pinned measurements. I would like judge some of the numbers. A lot of it was guessing.

00:17:31.720 --> 00:17:33.380

Interviewee 5

And that's what we did.

00:17:34.060 --> 00:17:35.890

WU, Xiaopei [Student]

Wow. OK. Gotcha. Gotcha.

00:17:35.740 --> 00:17:37.550

Interviewee 5

But we only did that for.

00:17:38.260 --> 00:17:41.900

Interviewee 5

Because we didn't do 100% work from home for terribly long.

00:17:42.720 --> 00:17:43.160

Interviewee 5

Uh.

00:17:44.480 --> 00:17:48.930

Interviewee 5

We started going back to the office to do an office fittings maybe in.

00:17:51.430 --> 00:17:52.060

Interviewee 5

June.

00:17:53.060 --> 00:17:53.870

WU, Xiaopei [Student]

Already.

00:17:53.490 --> 00:17:57.760

Interviewee 5

No. Yeah. June of of 2020.

00:17:58.200 --> 00:18:01.820

WU, Xiaopei [Student]

Yeah, like, that's soon. I mean, because it was so bad.

00:17:58.420 --> 00:18:03.000

Interviewee 5

And it it. Yeah, it might have been may, yeah.

00:18:05.670 --> 00:18:06.150

Interviewee 5

Excuse me.

00:18:08.750 --> 00:18:16.700

Interviewee 5

Yeah, we I it was like kind of this like one big round of fitting that we did virtually and then it was kinda like this is this sucks.

00:18:18.660 --> 00:18:22.850

Interviewee 5

And with the like time difference, it was really hard because we're doing.

00:18:23.860 --> 00:18:28.860

Interviewee 5

On fittings from like 9:00 PM until 11:00 PM.

00:18:31.760 --> 00:18:39.800

Interviewee 5

And sometimes later there was talk of, like, I forget. Ohh, it must have been with Amit chronic here.

00:18:41.560 --> 00:18:42.800

Interviewee 5

Over this past winter.

00:18:43.460 --> 00:18:44.050

Interviewee 5

They.

00:18:44.810 --> 00:18:50.720

Interviewee 5

Kind of. We're like, let's, you know, think of a plan in case there's another lockdown which, like, didn't end up happening.

00:18:52.440 --> 00:18:55.470

Interviewee 5

But the plan was gonna be we were not gonna do.

00:18:56.540 --> 00:19:02.230

Interviewee 5

Hong Kong fitting garments for us because they also you, I think at the time you guys were starting a lockdown maybe.

00:19:03.000 --> 00:19:04.220

Interviewee 5

Are we had it before you?

00:19:05.070 --> 00:19:11.450

WU, Xiaopei [Student]

You're the worst of your way was in the yeah, like the hall during the holidays. And then we said, yeah.

00:19:06.420 --> 00:19:06.850

Interviewee 5

We have.

00:19:08.680 --> 00:19:09.160

Interviewee 5

Yeah.

00:19:12.170 --> 00:19:17.030

Interviewee 5

But yeah, we all just kind of agreed. It was like really hard to fit that way. So it was.

00:19:17.250 --> 00:19:20.310

Interviewee 5

UM, we were going to send.

00:19:21.800 --> 00:19:31.810

Interviewee 5

Garments garments were gonna be sent to our apartments. We'd like to take our measurements and stuff. Then they would be sent to our fit model and she would pin on herself.

00:19:33.350 --> 00:19:34.030

WU, Xiaopei [Student]

How?

00:19:34.300 --> 00:19:34.700

Interviewee 5

Yeah.

00:19:35.230 --> 00:19:35.970

WU, Xiaopei [Student]

Oh my God.

00:19:35.420 --> 00:19:50.090

Interviewee 5

Which she which she had done for other brands that she works for, like during the like height of COVID lockdown. That's what she had done and well, thankfully our bit model actually had worked as a tech designer.

00:19:43.540 --> 00:19:44.100

WU, Xiaopei [Student]

What?

00:19:51.150 --> 00:19:51.710

WU, Xiaopei [Student]

OK.

00:19:51.210 --> 00:19:54.650

Interviewee 5

Before she started to fit modeling. So like you know, she.

00:19:55.380 --> 00:19:57.750

Interviewee 5

Her, like pinning, isn't terrible.

00:19:58.550 --> 00:20:04.570

WU, Xiaopei [Student]

That's yeah, I have not heard that. OK, that's really interesting nuance of it. So here at that part.

00:20:00.930 --> 00:20:01.390

Interviewee 5

Yeah.

00:20:13.090 --> 00:20:16.670

Interviewee 5

That's much or like add here. Like she's. Yeah, she's pretty.

00:20:17.730 --> 00:20:19.640

Interviewee 5

Pretty techie so.

00:20:38.550 --> 00:20:44.550

Interviewee 5

But we've gone like 3/3. We're like 3 different models since you since you were at Tori.

00:20:41.210 --> 00:20:43.730

WU, Xiaopei [Student]

OK. Yeah. I'm just trying to like so long.

00:20:46.720 --> 00:20:48.340

Interviewee 5

Because they change their mind.

00:21:15.180 --> 00:21:15.570

Interviewee 5

Umm.

00:21:20.680 --> 00:21:54.070

WU, Xiaopei [Student]

Yeah. So, OK. So last sort of question based on this diagram, right, this is just a hypothetical system where like for example, right, let me describe it to you and then you can give me your feedback. So if you had this computer system where you could like AI based where you could put in images inspiration images and specify attributes of like a kind of stitch that you would want to develop, right? So like you say, you know, like say for example, these are the inspiration images and then you would want like a sporty, whatever fine gauge Matt texture, just some like general descriptions.

00:21:30.910 --> 00:21:31.520

Interviewee 5

Alright, I'm gonna.

00:21:32.460 --> 00:21:32.860

Interviewee 5

Yeah.

00:21:54.610 --> 00:21:59.320

WU, Xiaopei [Student]

And then from that, like the AI algorithm would be able to develop.

00:21:55.050 --> 00:21:55.210

Interviewee 5

Umm.

00:22:00.100 --> 00:22:01.560

WU, Xiaopei [Student]

Umm and generate?

00:22:02.230 --> 00:22:03.350

WU, Xiaopei [Student]

Just from scratch.

00:22:04.100 --> 00:22:09.830

WU, Xiaopei [Student]

UM Swatch options, right? So visual like digital image Swatch options which.

00:22:09.790 --> 00:22:10.370

Interviewee 5

Umm.

00:22:10.670 --> 00:22:26.780

WU, Xiaopei [Student]

Could be then sent to the factory. Could be used by designer to like give them inspiration or whatnot. Or Umm, how do I say like for the like for them to develop further or like they could use it as like a skin on a virtual in a virtual sampling program setting right and then like.

00:22:21.120 --> 00:22:21.400

Interviewee 5

Umm.

00:22:27.760 --> 00:22:33.630

WU, Xiaopei [Student]

Fast forward. You can all even like if there were open to it being used towards like UM.

00:22:34.480 --> 00:22:38.010

WU, Xiaopei [Student]

Have it like predict or suggest yarns and then.

00:22:38.840 --> 00:22:52.620

WU, Xiaopei [Student]

If they need a physical knit down, UM, it would be able to translate it directly into actual like a what do you call it? The knit software? Any of like the store schema being seamless with that and then?

00:22:49.350 --> 00:22:50.420

Interviewee 5

Umm.

00:22:53.800 --> 00:23:03.840

WU, Xiaopei [Student]

Password on to like the actual sample, right? So then obviously the bottom part is like a lot of what the advantages of virtual sampling already is, but I kind of want to focus on this top part this.

00:23:04.520 --> 00:23:06.120

WU, Xiaopei [Student]

Potential UM.

00:23:06.830 --> 00:23:10.300

WU, Xiaopei [Student]

Feature or like added UM.

00:23:10.940 --> 00:23:33.070

WU, Xiaopei [Student]

Function right? So this kind of function where you could have a computer develop Swatch options. Is this something that you could see the facilitating designers like the creative design process that they're working in or do you think it's like at least for now it's like too far? And then given the fact that sweaters are I'm just giving examples of like potentially people would say like at the fact that sweaters are super?

00:23:33.910 --> 00:23:42.910

WU, Xiaopei [Student]

Umm, something that needs to be very physical and you have to see the stage. So that's very unrealistic. Or yeah, where do you see something like this potentially helping or not? Yeah.

00:23:36.690 --> 00:23:37.020

Interviewee 5

Yes.

00:23:43.550 --> 00:23:45.840

Interviewee 5

I actually feel like for the.

00:23:48.220 --> 00:23:53.950

Interviewee 5

Developing stitches like stuff like a cable or lace or.

00:23:56.420 --> 00:23:57.860

Interviewee 5

I mean even.

00:23:59.000 --> 00:24:02.310

Interviewee 5

In Intarsia for that matter, or some of these like.

00:24:04.870 --> 00:24:06.400

Interviewee 5

You know the ADF stuff.

00:24:07.200 --> 00:24:08.030

WU, Xiaopei [Student]

Umm.

00:24:08.860 --> 00:24:23.200

Interviewee 5

Like, I feel like all of those things could pop, like for sure be because so much of that I feel like it's trial, you know, like with, you know, when you're figuring out like, a a fisherman's sweater.

00:24:23.880 --> 00:24:26.240

Interviewee 5

Like usually, there's like 5 different.

00:24:27.030 --> 00:24:32.230

Interviewee 5

Swatches that are pulled like this cable and this twist and this.

00:24:32.900 --> 00:24:34.750

Interviewee 5

Whatever stitch on.

00:24:35.740 --> 00:24:37.920

Interviewee 5

And to figure out like.

00:24:38.770 --> 00:24:39.990

Interviewee 5

Basically your.

00:24:41.220 --> 00:24:45.560

Interviewee 5

Like Master Swatch, your stitch layout.

00:24:48.580 --> 00:24:53.210

Interviewee 5

You know, like, let's say you wanted a giant like a what you would pin on to like a front?

00:24:56.960 --> 00:25:06.420

Interviewee 5

To have that like figured out in 3D is like I think actually would be like super helpful because then you could kind of like play around with things in.

00:25:07.280 --> 00:25:09.240

Interviewee 5

In uh, like a 3D?

00:25:09.940 --> 00:25:13.060

Interviewee 5

Program have the like visual.

00:25:13.700 --> 00:25:20.700

Interviewee 5

You know, it's you. It's not tactile. You can't feel it, but you get the the feeling of how it will look.

00:25:21.400 --> 00:25:23.430

Interviewee 5

Have a couple different options.

00:25:25.010 --> 00:25:40.150

Interviewee 5

And then like, OK, let's actually get knit downs of options B and options F you know like same thing with like a last ditch or whatever. Like you could look at a, a a bunch of different like lease options and then narrow it down to.

00:25:41.360 --> 00:25:48.860

Interviewee 5

The ones that you actually want to get unit down of instead of like wasting yarn getting and time getting.

00:25:49.950 --> 00:25:50.790

Interviewee 5

20 Leafs.

00:25:51.540 --> 00:25:52.720

Interviewee 5

It down. You know what I mean?

00:25:52.770 --> 00:26:05.250

WU, Xiaopei [Student]

Alright. Yeah, so that's like exactly sort of the idea. I just, I'm half forgetting on and I don't know if it's changed or not like just send it down process in terms of like.

00:26:04.860 --> 00:26:05.180

Interviewee 5

Umm.

00:26:06.230 --> 00:26:13.490

WU, Xiaopei [Student]

Especially now with the pandemic, I don't know if they're trying to not like have so many things sent, but are they still very much relying on?

00:26:14.730 --> 00:26:17.240

WU, Xiaopei [Student]

Like milk cars, you know the swatches from there like.

00:26:17.050 --> 00:26:17.520

Interviewee 5

Yeah.

00:26:18.360 --> 00:26:39.270

WU, Xiaopei [Student]

Or is it something like you're saying you're describing? Like ohh, they like, you know, maybe elements from different things and want to combine it. Are they being very creative from scratch within it downs? Do they ever do that or is it still very much, yeah. Physical. Like they see something. I see sample choice and the vintage sample whatever they replicate that or.

00:26:31.760 --> 00:26:32.120

Interviewee 5

It's.

00:26:39.790 --> 00:26:50.960

Interviewee 5

It's a it's definitely a mix. So there's like what I said that they'll take like elements from different things and and it'll be like.

00:26:42.720 --> 00:26:42.960

WU, Xiaopei [Student]

OK.

00:26:51.920 --> 00:27:00.970

Interviewee 5

A yarn, a yarn, then a different Swatch that's a stitch, and then a different Swatch that is like a detail. Put all these three things together.

00:27:01.610 --> 00:27:02.260

WU, Xiaopei [Student]

OK.

00:27:03.240 --> 00:27:07.650

Interviewee 5

Or so there's that there is the reliance on mill card still.

00:27:09.970 --> 00:27:14.760

Interviewee 5

Then also the, you know, Tory bring something in. Follow this.

00:27:15.660 --> 00:27:16.530

Interviewee 5

Exactly.

00:27:17.050 --> 00:27:22.690

Interviewee 5

UM and then also they are doing more NIT downs in the office.

00:27:24.200 --> 00:27:25.310

WU, Xiaopei [Student]

In the.

00:27:25.970 --> 00:27:27.260

Interviewee 5

In a Tory Burch office.

00:27:26.670 --> 00:27:32.870

WU, Xiaopei [Student]

With like a hand flat like somebody is actually OK, like the designers are doing themselves.

00:27:29.970 --> 00:27:31.930

Interviewee 5

Hmm. Handclap machine? Yeah.

00:27:34.450 --> 00:27:35.950

WU, Xiaopei [Student]

OK. What do you watch it?

00:27:37.800 --> 00:27:41.120

Interviewee 5

But there's only so much that you can do with that. You know what I mean?

00:27:41.650 --> 00:27:44.020

WU, Xiaopei [Student]

Yeah. Yeah. What's the time and yeah.

00:27:43.940 --> 00:27:49.150

Interviewee 5

Yeah. And between time and that, I feel like is more for like novelty.

00:27:49.700 --> 00:27:52.400

Interviewee 5

UM, like they aren't doing like.

00:27:53.460 --> 00:27:55.370

Interviewee 5

Where, you know 16 gauge rib.

00:27:56.150 --> 00:27:59.330

Interviewee 5

Knit downs on that, they're doing very novelty.

00:28:00.390 --> 00:28:03.900

WU, Xiaopei [Student]

True. True. True. That's a good point. I mean, it could be different for.

00:28:04.710 --> 00:28:09.480

WU, Xiaopei [Student]

I suppose this application could be different for like novelty style novel styles versus.

00:28:09.690 --> 00:28:10.030

Interviewee 5

Yeah.

00:28:10.490 --> 00:28:11.030

WU, Xiaopei [Student]

More than.

00:28:11.730 --> 00:28:13.910

WU, Xiaopei [Student]

Repeat classic type OK.

00:28:13.680 --> 00:28:13.960

Interviewee 5

Yeah.

00:28:14.780 --> 00:28:16.240

WU, Xiaopei [Student]

Got it. Cool.

00:28:16.060 --> 00:28:21.520

Interviewee 5

His thought. Olympic. Yeah, all I'm thinking of is this cable style that we did that was like a nightmare that would have been.

00:28:22.440 --> 00:28:26.730

Interviewee 5

Actually fixed in like a day. If we 30 program.

00:28:28.620 --> 00:28:41.230

WU, Xiaopei [Student]

Well, Speaking of timing, how long is it taking now to just the developing of the knit down part of the process. So in terms of for example, when they actually start?

00:28:30.990 --> 00:28:31.250

Interviewee 5

Umm.

00:28:43.000 --> 00:28:48.100

WU, Xiaopei [Student]

Developing and then I suppose, like approving on their boards and then sending to factories.

00:28:46.420 --> 00:28:46.840

Interviewee 5

Yeah.

00:28:50.080 --> 00:28:53.500

WU, Xiaopei [Student]

To actually send options like how long issues that process.

00:28:54.550 --> 00:28:58.850

Interviewee 5

I feel like the the actual knit down turn around time is.

00:28:59.700 --> 00:29:08.040

Interviewee 5

Not terrible, right? Right. Now it like for them to make an it down. If the yarn is in house, it's a couple of days mailing.

00:29:08.760 --> 00:29:12.010

Interviewee 5

Things back and forth has been adding to delays.

00:29:13.350 --> 00:29:13.840

Interviewee 5

But.

00:29:14.890 --> 00:29:16.730

Interviewee 5

The process from like start.

00:29:17.540 --> 00:29:22.930

Interviewee 5

You know when the idea arises 2 receiving actual knit down.

00:29:23.620 --> 00:29:27.050

Interviewee 5

That's a long, long process, but it's kind of that is.

00:29:27.890 --> 00:29:32.230

Interviewee 5

Just design process like they have to jump through hoops to get.

00:29:33.860 --> 00:29:46.540

Interviewee 5

Like you know how it is, it's like they have yarn meetings with Tori and they have this meeting with Tori and that meeting with Tori and blah blah blah, you know? So it's like that just adds a ton a ton of time on to the process.

00:29:39.420 --> 00:29:39.970

WU, Xiaopei [Student]

Exactly.

00:29:47.270 --> 00:29:48.120

WU, Xiaopei [Student]

Right, right.

00:29:47.640 --> 00:29:53.420

Interviewee 5

But like from actually requesting an it down to receiving it I maybe?

00:29:54.150 --> 00:29:58.550

Interviewee 5

If they have the yarn in house, maybe, let's say like a week and a half.

00:29:59.510 --> 00:30:09.900

WU, Xiaopei [Student]

OK. And then OK, last question is just like with Tory, have you seen her be more receptive to?

00:30:11.300 --> 00:30:14.100

WU, Xiaopei [Student]

Digitized formats of designs.

00:30:14.710 --> 00:30:15.020

Interviewee 5

No.

00:30:15.830 --> 00:30:20.460

WU, Xiaopei [Student]

OK, that's kind of what I expected with alright, alright.

00:30:18.660 --> 00:30:19.010

Interviewee 5

No.

00:30:22.100 --> 00:30:24.230

Interviewee 5

Well, OK, so they have this is.

00:30:26.940 --> 00:30:29.690

Interviewee 5

This is a. It's not so much like.

00:30:30.460 --> 00:30:31.740

Interviewee 5

Yeah, maybe it's related.

00:30:33.970 --> 00:30:37.850

Interviewee 5

So they have started to change the way that they're sketching.

00:30:38.600 --> 00:30:39.660

Interviewee 5

And.

00:30:40.640 --> 00:30:42.470

Interviewee 5

They're doing a lot more.

00:30:44.560 --> 00:30:52.010

Interviewee 5

Like up when you were at Torrey and then up until recent very recently, like I mean months recently.

00:30:54.930 --> 00:30:55.850

Interviewee 5

It was all.

00:30:57.100 --> 00:30:57.990

Interviewee 5

And sketch.

00:30:59.060 --> 00:30:59.530

Interviewee 5

Catches.

00:31:00.050 --> 00:31:00.520

Interviewee 5

Uh.

00:31:03.300 --> 00:31:06.480

Interviewee 5

Like even like illustrator, things were kind of like.

00:31:08.110 --> 00:31:10.060

Interviewee 5

Didn't didn't really happen all that much.

00:31:12.320 --> 00:31:35.090

Interviewee 5

So now what they've started doing is they got a iPads and at least this is specifically for sweaters. I don't really know what wovens is doing, but sweaters is doing drawing on the iPad, and then they're taking scans of their swatches for, like the texture or whatever and dragging that in.

00:31:35.830 --> 00:31:42.790

Interviewee 5

To their what they've like sketched on the iPad. They're not using Photoshop, they're using procreate.

00:31:44.140 --> 00:31:47.050

Interviewee 5

Uh. Which is like, it's like an Apple App.

00:31:44.170 --> 00:31:44.540

WU, Xiaopei [Student]

Alright.

00:31:48.790 --> 00:31:49.140

Interviewee 5

So it.

00:31:50.000 --> 00:31:51.360

Interviewee 5

It's not 3D.

00:31:52.380 --> 00:31:55.710

Interviewee 5

But it has more of like a rendered.

00:31:56.540 --> 00:31:57.340

Interviewee 5

You get the.

00:31:58.630 --> 00:32:07.440

Interviewee 5

That the texture feel like that you actually have with this letter instead of like just a flat outline drawing of like a cardigan. You know what I mean?

00:32:08.010 --> 00:32:08.430

WU, Xiaopei [Student]

Sonic.

00:32:09.160 --> 00:32:13.890

Interviewee 5

So they're give like when they drag and he's like swatches at, like gives it the feeling of like.

00:32:09.410 --> 00:32:09.840

WU, Xiaopei [Student]

OK.

00:32:14.550 --> 00:32:20.370

Interviewee 5

You know mohair or a mesh stitch or whatever it is instead of just a flat.

00:32:21.250 --> 00:32:26.140

Interviewee 5

Try. It looks like some cross hatches in there or something like kind of sad, yeah.

00:32:24.010 --> 00:32:25.410

WU, Xiaopei [Student]

Right. Yeah, yeah.

00:32:28.750 --> 00:32:39.070

WU, Xiaopei [Student]

Cool. Alright, well, that was like, thank you. Yeah, I think there's a lot that gets there and also a lot, a lot of, like, refreshers, like past life.

00:32:33.160 --> 00:32:34.100

Interviewee 5

No problem.

Interviewee 6:

00:00:20.360 --> 00:00:22.980

WU, Xiaopei [Student]

A record. So I remember, yeah.

00:00:21.420 --> 00:00:22.100

Interviewee 6

Yeah, that's fine.

00:00:25.940 --> 00:00:28.630

WU, Xiaopei [Student]

OK. So the first question.

00:00:30.020 --> 00:00:33.450

WU, Xiaopei [Student]

Is just to confirm your.

00:00:35.790 --> 00:00:37.160

WU, Xiaopei [Student]

Area of.

00:00:37.890 --> 00:00:43.580

WU, Xiaopei [Student]

Work at UM Tori like what is your area? You are doing production, correct?

00:00:43.280 --> 00:00:45.880

Interviewee 6

Product development and production for ready to wear.

00:00:46.290 --> 00:00:47.090

WU, Xiaopei [Student]

OK. Gotcha.

00:00:50.130 --> 00:00:53.620

WU, Xiaopei [Student]

And as of now, how many years that Tory have been?

00:00:54.480 --> 00:00:56.340

Interviewee 6

It'll be 8 in September.

00:00:58.560 --> 00:01:05.060

WU, Xiaopei [Student]

So you're almost nearing that 10 year Mark. Crazy. OK, so, OK. The first question is.

00:01:06.100 --> 00:01:11.110

WU, Xiaopei [Student]

Umm, what do you know about how artificial intelligence is being used in the fashion industry, if anything?

00:01:13.040 --> 00:01:16.160

Interviewee 6

UM, not as much.

00:01:17.020 --> 00:01:17.340

WU, Xiaopei [Student]

OK.

00:01:18.220 --> 00:01:18.870

WU, Xiaopei [Student]

So.

00:01:21.340 --> 00:01:24.930

WU, Xiaopei [Student]

If not, then how would you see it?

00:01:26.160 --> 00:01:31.330

WU, Xiaopei [Student]

Facilitating the creative design process and knitwear, or in other categories.

00:01:32.760 --> 00:01:35.880

Interviewee 6

I I would be interested in using it.

00:01:38.400 --> 00:01:40.520

Interviewee 6

In with the goal to.

00:01:43.510 --> 00:01:45.240

Interviewee 6

Fine products that.

00:01:46.020 --> 00:01:46.470

Interviewee 6

Would.

00:01:47.420 --> 00:01:51.810

Interviewee 6

Best to meet the expectations and the needs of our customers.

00:01:52.350 --> 00:01:52.810

WU, Xiaopei [Student]

Umm.

00:01:55.760 --> 00:01:59.750

WU, Xiaopei [Student]

So currently, would you say that's?

00:02:00.850 --> 00:02:02.240

WU, Xiaopei [Student]

A challenge still.

00:02:03.720 --> 00:02:04.330

WU, Xiaopei [Student]

Without.

00:02:04.070 --> 00:02:18.960

Interviewee 6

Yeah, I think I think sometimes we put our own thoughts or we put a lot of focus on pleasing Tori and not as much, maybe always on what the customer is actually looking for.

00:02:21.000 --> 00:02:21.910

WU, Xiaopei [Student]

OK. So then.

00:02:21.580 --> 00:02:25.230

Interviewee 6

And that can be from fabric choice through how it fits.

00:02:25.660 --> 00:02:25.940

WU, Xiaopei [Student]

OK.

00:02:26.920 --> 00:02:38.650

WU, Xiaopei [Student]

So then, aside from artificial intelligence or whatever, what you are can thinking of as artificial intelligence, are there any digital technologies that currently being used that you feel like are?

00:02:39.530 --> 00:02:42.920

WU, Xiaopei [Student]

Helpful towards what? You're just saying the helpful towards.

00:02:43.690 --> 00:02:45.250

WU, Xiaopei [Student]

Understanding what the customer needs.

00:02:46.660 --> 00:02:47.720

WU, Xiaopei [Student]

Doing that sort of thing.

00:02:47.490 --> 00:03:08.410

Interviewee 6

Yeah. So we invested in things like close or you know simple tools like that in order to determine fit or layout or construction. But the design team has not embraced any of it. They don't, they're not interested in any of it.

00:03:10.050 --> 00:03:13.380

WU, Xiaopei [Student]

Where do you think barrier is currently?

00:03:14.220 --> 00:03:14.620

WU, Xiaopei [Student]

Still.

00:03:14.260 --> 00:03:15.200

Interviewee 6

Where do I think what?

00:03:15.440 --> 00:03:19.030

WU, Xiaopei [Student]

What's the main barrier now? Or I suppose there might be several barrier?

00:03:18.090 --> 00:03:26.620

Interviewee 6

They they want they, I think, and I don't know how much of this is driven because Tory works this way, but they want to be they want.

00:03:27.300 --> 00:03:28.670

Interviewee 6

Samples they want.

00:03:29.650 --> 00:03:30.700

Interviewee 6

Full on samples.

00:03:31.160 --> 00:03:31.790

WU, Xiaopei [Student]

Got it.

00:03:31.390 --> 00:03:33.630

Interviewee 6

They're not interested in anything that's visual.

00:03:35.010 --> 00:03:36.180

WU, Xiaopei [Student]

Got it. OK.

00:03:40.600 --> 00:03:41.250

WU, Xiaopei [Student]

So then.

00:03:43.150 --> 00:03:43.870

WU, Xiaopei [Student]

Is there?

00:03:45.810 --> 00:03:51.790

WU, Xiaopei [Student]

Any part of the process that you feel like for the creative part. So in terms of?

00:03:51.610 --> 00:03:52.280

Interviewee 6

Attempts are.

00:03:52.890 --> 00:03:54.220

WU, Xiaopei [Student]

Design creativity.

00:03:55.040 --> 00:04:09.260

WU, Xiaopei [Student]

You feel like things like Chloe are restrictive towards it and not helpful or we don't. I mean, not just close. There's other potential digital technologies or computational things that could be used. Do you think it's? Yeah.

00:04:07.930 --> 00:04:29.310

Interviewee 6

No, I I think I think it could be helpful. I think it's a good tool like for example, you know we don't really make MO anymore, but if we were to make something for MFO, why can't we just sample it on close? Or if we're making a a Simone, for example, why can't we just sample it on clothes? Do we need to keep making all these samples? But.

00:04:28.850 --> 00:04:29.280

WU, Xiaopei [Student]

OK.

00:04:30.050 --> 00:04:39.380

Interviewee 6

And some of the designers, to be fair, have shown a little bit of interest in the beginning. But then when they found out that Tori wasn't so interested, all of the interest fell away.

00:04:40.960 --> 00:04:42.390

WU, Xiaopei [Student]

OK, I see that makes.

00:04:43.190 --> 00:05:02.190

WU, Xiaopei [Student]

Umm, but no, that's not actually really good point you bring up in terms of certain styles being potentially more suitable for, or at least for design to be embracing more for maybe classic styles or blocks like that. OK, got it. So and then currently is was closed one that's being used.

00:05:02.350 --> 00:05:04.750

WU, Xiaopei [Student]

UM, is that something that?

00:05:05.640 --> 00:05:11.980

WU, Xiaopei [Student]

Is still being used by tech, I suppose, or tech or the suppliers. Even if design like it sounds like at least.

00:05:11.530 --> 00:05:11.840

Interviewee 6

Where?

00:05:12.750 --> 00:05:13.100

WU, Xiaopei [Student]

Oh yeah.

00:05:12.970 --> 00:05:15.710

Interviewee 6

We're using it for print and embellishment layouts.

00:05:16.400 --> 00:05:22.080

WU, Xiaopei [Student]

Ohh OK. Like we as in who is physically doing the CLU for that? Like creating it or.

00:05:21.950 --> 00:05:24.650

Interviewee 6

It's it's. It's a woman that we hired.

00:05:25.870 --> 00:05:29.270

Interviewee 6

Who is managing all of the digital pattern work?

00:05:30.200 --> 00:05:35.030

Interviewee 6

And she also manages clothes so she works on Lectra, Optitex and Chloe.

00:05:30.240 --> 00:05:30.550

WU, Xiaopei [Student]

Uh.

00:05:35.630 --> 00:05:40.330

WU, Xiaopei [Student]

OK. And then when she uses it, is she creating or is she?

00:05:41.280 --> 00:05:45.720

WU, Xiaopei [Student]

Translating from an existing design like basically copying and.

00:05:45.100 --> 00:06:01.780

Interviewee 6

She's translating, so she's working with PD and design to put the embellishment or the print on the form, and then they move it around to see what the best yield would be, what the patterns would look like, what the sizes would look like.

00:05:46.580 --> 00:05:46.890

WU, Xiaopei [Student]

OK.

00:06:02.160 --> 00:06:07.830

WU, Xiaopei [Student]

OK. And then in the in terms of like conception, so the part where design is actually like?

00:06:08.930 --> 00:06:22.340

WU, Xiaopei [Student]

Creating an idea that part is not really being done on a digital or is it? Is it being in OK? So all that is still being done? I would say very manually by hand slash and then illustrator those things.

00:06:23.760 --> 00:06:24.130

WU, Xiaopei [Student]

OK.

00:06:25.300 --> 00:06:27.710

WU, Xiaopei [Student]

Sounds good, persistent. Alright. UM.

00:06:27.390 --> 00:06:28.860

Interviewee 6

It hasn't changed again.

00:06:31.370 --> 00:06:36.450

WU, Xiaopei [Student]

And you never know, I mean, certain things I feel like, yeah, surprise me. Other things, I'm like, OK well.

00:06:37.910 --> 00:06:45.130

WU, Xiaopei [Student]

Sounds consistent and then OK, so the last part then I just wanna share with you a little.

00:06:39.970 --> 00:06:40.270

Interviewee 6

Yeah.

00:06:45.810 --> 00:06:56.420

WU, Xiaopei [Student]

Hypothetical digital process and get your input on so I know you don't have to read all, walk you through it. I know the writing is very small.

00:06:57.430 --> 00:07:05.540

WU, Xiaopei [Student]

Umm, but say in this hypothetical process right you were there is a program, a computer program that is able to facilitate.

00:07:06.430 --> 00:07:13.550

WU, Xiaopei [Student]

Taking in you would input or designer would input digital images of, say, inspiration, right? So say.

00:07:14.930 --> 00:07:43.720

WU, Xiaopei [Student]

This is just a very basic example, right? If there's like, you know, the see whatever is inspiration, you put all these inspiration photos in and then you would define what your needs were in terms of what you would want the the knit down Swatch to resonate with, right? So you would say like you would want it to be a fine gauge stitch. You know, Matt, texture, yarn or whatever, just like some basic requirements. And then based on those the IT would like be powered by AI and it would understand those needs and translate it into.

00:07:44.410 --> 00:08:11.510

WU, Xiaopei [Student]

What it would learn to UM based on machine learning would translate it into a stitch that would resonate with what the designer might want. And so these different, like unlimited sort of stitch options as a way to creatively inspire. And then you could actually send it straight into machine, which would translate it into an, you know, NIT programming information for to for the factory to make a Nic down, right? So something like this without going on too much debt.

00:08:10.990 --> 00:08:11.450

Interviewee 6

Yeah.

00:08:12.510 --> 00:08:13.410

WU, Xiaopei [Student]

Do you think something?

00:08:12.770 --> 00:08:25.950

Interviewee 6

I took you off camera so I could so I could get close to it to see it. It's it. Looks really interesting to me. I don't know why they would not be interested in that because it's just more input to their creative process.

00:08:16.930 --> 00:08:17.460

WU, Xiaopei [Student]

Yeah, I know.

00:08:26.870 --> 00:08:27.350

WU, Xiaopei [Student]

OK.

00:08:28.510 --> 00:08:33.640

WU, Xiaopei [Student]

So this sort of thing, I mean, especially based on your experience at a you know?

00:08:34.310 --> 00:08:35.040

WU, Xiaopei [Student]

With the.

00:08:36.050 --> 00:08:38.850

WU, Xiaopei [Student]

Lack of of receptivity to.

00:08:40.010 --> 00:08:47.620

WU, Xiaopei [Student]

Digital like integrating digital virtual sampling that I've heard of, not just a Tory, but other companies. Even with that, do you think like?

00:08:49.030 --> 00:09:08.640

WU, Xiaopei [Student]

Designers are not ready for this kind of like adoption of technology into the like the creative process, the conception design process, or is it? Do you think it down the line? It's going to happen quickly or like what are the things that you would think would facilitate this thumb being receptive to this sort of thing?

00:09:09.690 --> 00:09:17.540

Interviewee 6

So I would think if if we were to go to Vicky, who's the head of sweaters for example, and show her this, I would think she would give it.

00:09:18.440 --> 00:09:36.150

Interviewee 6

A a a chance because she's the queen of knit Downs. So I would think that she would look at this like she would look at a library from a from a sweater factory and and pick all of the knit downs. But this would then feed into all of the physical samples that she's still requesting.

00:09:38.710 --> 00:09:46.630

WU, Xiaopei [Student]

Ohh and then OK, so that's good to hear. In terms of timing though, do you feel like they are still?

00:09:47.530 --> 00:09:48.120

WU, Xiaopei [Student]

UM.

00:09:49.380 --> 00:10:07.340

WU, Xiaopei [Student]

You say like so in terms of the knit down sort of lead times because I know that of course the physicality like you were saying earlier is very important, right? So even with this sort of process, do you think that it would still be a challenge like they would still be using this, but still very much relying on the physical Nic downs like at?

00:10:08.050 --> 00:10:29.900

WU, Xiaopei [Student]

Umm, they would need it wouldn't be straight for like. OK, I see the digital image and I can just use it as a skin on a virtual like design program to visualize it. But it would not go straight into like a proton for example. They would need to seeing it down. Or do you think at any point it would be able to be seamlessly integrated into like a straight to prototype situation?

00:10:30.840 --> 00:10:31.530

Interviewee 6

I think.

00:10:33.490 --> 00:10:45.410

Interviewee 6

Excuse me, I think after they get used to it potentially it could go straight into a proto. But honestly, right now per season, Vicki for example for holiday.

00:10:46.590 --> 00:10:51.570

Interviewee 6

She's proud she's sampled 112 sweaters and we need 21.

00:10:53.740 --> 00:11:07.270

Interviewee 6

And and that's just SMS, that's not the protos and I I wanna say she requested about 175 knit downs and panels before she went into proto before she went into SMS.

00:11:08.070 --> 00:11:08.440

WU, Xiaopei [Student]

OK.

00:11:09.440 --> 00:11:11.980

Interviewee 6

To the wastage continues to be massive.

00:11:12.900 --> 00:11:13.320

WU, Xiaopei [Student]

OK.

00:11:14.350 --> 00:11:15.120

WU, Xiaopei [Student]

So.

00:11:17.600 --> 00:11:37.050

WU, Xiaopei [Student]

And then I suppose, like what surprises me is that because if you're relying on, if you're still relying on getting that many physical samples, then they're still relying on the same. And I'm assuming they're working with overseas vendors still, right, it's suppliers. So that those samples still need to be sent. There's transit time involved and whatnot. And is that?

00:11:37.730 --> 00:11:43.720

WU, Xiaopei [Student]

Is that transit time similar to this was three years ago? Like, would it be the sort of?

00:11:45.190 --> 00:11:47.860

WU, Xiaopei [Student]

Three to five days sending, you know all that sort of.

00:11:49.040 --> 00:11:55.020

Interviewee 6

No. Now it may be before when it was like anywhere from three to five days now it's.

00:11:55.780 --> 00:11:58.110

Interviewee 6

10 to 10 days to two weeks.

00:11:58.850 --> 00:12:03.580

WU, Xiaopei [Student]

Oh, wow. OK. And then that's just accommodated in the calendar or?

00:12:04.190 --> 00:12:06.320

Interviewee 6

Yeah, we had to. We had to well.

00:12:06.980 --> 00:12:29.990

Interviewee 6

We tried to build it into the calendar. You know, we tried to put in at least a full week, but with COVID and all of the disruption for logistics that's happened around the world, it's it's and also things getting held up in customs more now it's it's taking a lot more and even if we build it into the calendar you know as well as I that they don't hit their dates. So we're always struggling to get things on time.

00:12:31.340 --> 00:12:31.780

WU, Xiaopei [Student]

OK.

00:12:32.520 --> 00:12:32.950

WU, Xiaopei [Student]

Culture.

00:12:35.330 --> 00:12:40.860

WU, Xiaopei [Student]

So OK. So then going back to this sort of hypothetical proposal of a program.

00:12:42.410 --> 00:12:45.540

WU, Xiaopei [Student]

Would this do you think? Help. UM.

00:12:47.120 --> 00:12:54.030

WU, Xiaopei [Student]

The creative design process in terms of designer creativity, like what it help give them, you know, give them more time for creativity. Would it help?

00:12:55.040 --> 00:12:57.900

WU, Xiaopei [Student]

Reduce lead time liability. Would it help?

00:12:58.680 --> 00:13:06.350

WU, Xiaopei [Student]

You know, cost like help eventual reducing like the overall cost of out of these things, what do you think it would help most or least?

00:13:07.270 --> 00:13:10.440

Interviewee 6

I think all of the things that you mentioned are possible.

00:13:11.650 --> 00:13:13.370

Interviewee 6

I think at this company.

00:13:14.570 --> 00:13:44.650

Interviewee 6

In terms of cutting back on wastage, sustainability cost, all of that would not be probable given that they are still sampling like crazy people. I do think this could be interesting for them in terms of their concept and where they are taking the line in terms of the assortment. So it it's just would feed into more of their creative knowledge going into the season.

00:13:45.090 --> 00:13:45.470

WU, Xiaopei [Student]

Umm.

00:13:46.360 --> 00:13:52.050

Interviewee 6

But I don't think it would slow them down in terms of requesting as much as they request today.

00:13:52.820 --> 00:13:53.610

WU, Xiaopei [Student]

Got it. OK.

00:13:55.790 --> 00:13:56.170

Interviewee 6

And again.

00:13:56.860 --> 00:14:16.770

Interviewee 6

It I think if Tori or let's not, not even say Tori. I think it it always comes down to the head of design. Really. And what their kind of focus is. And if that head of design is into using virtual or really being sustainable or whatever, I think them people follow.

00:14:17.770 --> 00:14:19.280

WU, Xiaopei [Student]

Got it. OK. Yeah, that means.

00:14:21.300 --> 00:14:31.990

WU, Xiaopei [Student]

That's the last question I think just based on what you were saying, some of cause you mentioned sustainability a lot, right? So in terms of priority, I would say like I think my question is.

00:14:32.860 --> 00:14:34.610

WU, Xiaopei [Student]

What are some of the things you think?

00:14:35.990 --> 00:14:42.700

WU, Xiaopei [Student]

The design team, or Tory, on behalf of the design team, really care about at the moment in terms of like.

00:14:43.350 --> 00:15:01.450

WU, Xiaopei [Student]

Or sorry, what are some of the pain points that they really want to solve right, like in the process in terms of their process? Like if it's not about integrating it digital technology, so like close for them, maybe it's not a priority. What are some of the things it's sustainability like very loud for them, right? Or is it, is it something? What do you think it is in terms of the?

00:15:01.440 --> 00:15:09.760

Interviewee 6

So sustainability has really taken off at the company. We have a team now who only focus on sustainability.

00:15:11.130 --> 00:15:27.660

Interviewee 6

And it's all the way from materials that we choose through packaging to the suppliers to have the materials are harvested or made, water wasted following greenhouse emission rules. I mean, there's a lot on that plate.

00:15:28.950 --> 00:15:56.130

Interviewee 6

And what what what's happening now is that the design team is still choosing all of their fabrics to show Tory and then we move into how to make them more sustainable, how to find a sustainable option. And we, every season, every team has to post the materials that were used that were sustainable and how they were sustainable. And they're very obviously strict about what qualifies.

00:15:56.780 --> 00:16:03.780

WU, Xiaopei [Student]

Umm, OK. So solving the sustainability issue or not solving or trying to tackle it is more.

00:16:04.620 --> 00:16:05.450

WU, Xiaopei [Student]

They're using.

00:16:06.690 --> 00:16:16.190

WU, Xiaopei [Student]

Materials like they're attacking it from a material perspective versus like the trying to reduce wastage by using by relying more on virtual samples you would say.

00:16:16.230 --> 00:16:16.810

Interviewee 6

Correct.

00:16:17.300 --> 00:16:17.790

WU, Xiaopei [Student]

OK.

00:16:18.480 --> 00:16:19.710

WU, Xiaopei [Student]

And then the rest in.

00:16:18.690 --> 00:16:40.340

Interviewee 6

Correct. I was just not a call this morning about the amount of liability that we have, which has not as has not slowed down. And I was, you know, just kind of chuckling because people were like, well, we don't wanna spend X amount on a warehouse to hold the liability. And I'm like the amount that you're gonna pay for the warehouse for a year. I get an invoice every day for that amount for just liability.

00:16:42.030 --> 00:16:43.250

WU, Xiaopei [Student]

Got it. Wow. OK.

00:16:44.000 --> 00:16:50.720

Interviewee 6

So I don't think they're thinking about it that way. They're thinking about it more about the product and not about all of the waste.

00:17:23.900 --> 00:17:30.270

WU, Xiaopei [Student]

Ohh yeah, yeah. Hi. OK, you're back? Yeah. Those are the main questions. Yeah, actually, I mean.

00:17:29.740 --> 00:17:30.520

Interviewee 6

Was it home?

00:17:31.630 --> 00:17:38.470

WU, Xiaopei [Student]

For sure. Thank you so much for doing this. Umm, but yeah, it was really to get your site and also I mean I.

00:17:33.230 --> 00:17:33.600

Interviewee 6

OK.

00:17:34.800 --> 00:17:35.800

Interviewee 6

Yeah, that works.

00:17:39.310 --> 00:17:45.610

WU, Xiaopei [Student]

I'm gonna just stop the recording right now so I can save on the so the file doesn't have to be so big.

00:20:25.700 --> 00:20:26.320

WU, Xiaopei [Student]

Start again.

00:20:27.230 --> 00:20:28.970

WU, Xiaopei [Student]

Umm, we're designers.

00:20:30.240 --> 00:20:35.790

WU, Xiaopei [Student]

Because all the yarn shows a lot of them during that period when the yarn shows and a lot of fashion shows in general were virtual.

00:20:36.470 --> 00:20:37.710

WU, Xiaopei [Student]

Did that change?

00:20:40.080 --> 00:20:45.950

WU, Xiaopei [Student]

How they were making it downs or how they were being inspired and you know, in the beginning of the process that conception stage?

00:20:47.810 --> 00:20:48.510

WU, Xiaopei [Student]

Like part of that work.

00:20:48.020 --> 00:21:04.270

Interviewee 6

So in the beginning for us, we were all basically sent home on Friday. That's March 13th and we stayed in for two months and we tried to maintain as much.

00:21:05.730 --> 00:21:07.960

Interviewee 6

Normalcy as possible so.

00:21:08.720 --> 00:21:17.050

Interviewee 6

We were still operating, but working from home. So for example we were doing all of our fittings at night.

00:21:18.200 --> 00:21:34.290

Interviewee 6

Through the Hong Kong office, design was still working with the factories and requesting things as much as they could for whoever was open, and then the samples would go to peoples homes and then they would check them and then send them to Tori's home and we would have virtual.

00:21:35.540 --> 00:21:39.130

Interviewee 6

We would have virtual edits with her from her home.

00:21:40.290 --> 00:21:43.890

Interviewee 6

So everything happened the same way it would have in the office.

00:21:44.840 --> 00:22:11.670

Interviewee 6

But we were doing everything virtually and and we were working crazy hours because you would work all day like on your regular job and then you would have to work at night doing things virtually with the Asia team. So and then we reopen the office in June, the end of June and the pattern room team, the tech team, the PD teams, they all pretty much started going back into the office.

00:22:12.530 --> 00:22:12.920

WU, Xiaopei [Student]

OK.

00:22:13.110 --> 00:22:42.780

Interviewee 6

We would, we would have sign up sheets and design design was full on coming back into the office and there was a sign up sheet like who was gonna be in the office, how many people per floor. It was very strictly regulated. They had they had a nurse at the back door. We could only use the back door. Your temperature was taken as soon as you came in. You had to have a mask, gloves. You had to stay 6 feet away. They put up plexiglass between every sewing machine. We were alternating teams. There was a.

00:22:42.850 --> 00:23:06.210

Interviewee 6

Team and B. Team so there was only certain amount of people in the room at the time. It was very highly regulated. You had to do a sign up sheet to get approval to come into the office to make sure there were no more than say 30 people per floor and you know it's a big floor. It's the whole city block. So I mean it worked out pretty well, but it was very stressful. You know, when you're commuting when you're.

00:23:07.360 --> 00:23:23.950

Interviewee 6

You know, just having a pandemic, there is nothing, you know, it's just but. But that being said, the business continuity completely continued. People were excited and happy to be back at work and and you know we fortunately, you know it, it worked out well for us.

00:23:25.300 --> 00:23:27.530

Interviewee 6

I don't know if you can hear me, Jen, cause you're frozen.

00:23:30.760 --> 00:23:37.490

WU, Xiaopei [Student]

I think the last part it's still no, still recording your what you were saying, the transcript so.

00:23:39.130 --> 00:23:41.300

WU, Xiaopei [Student]

But you're back, I think. Wait back now?

00:23:42.400 --> 00:23:43.710

WU, Xiaopei [Student]

But in between the.

00:23:42.580 --> 00:23:43.150

Interviewee 6

OK, you're.

00:23:44.450 --> 00:23:47.020

WU, Xiaopei [Student]

And now I can hear you. So that's please.

00:23:46.460 --> 00:23:46.760

Interviewee 6

OK.

00:23:50.280 --> 00:23:51.270

WU, Xiaopei [Student]

Got it. OK.

00:23:52.490 --> 00:23:56.960

WU, Xiaopei [Student]

Were they? Do you know if they were like requesting things like milk cards to be sent then?

00:23:57.730 --> 00:23:59.820

WU, Xiaopei [Student]

Like trying to maintain the normal like.

00:23:58.140 --> 00:24:16.810

Interviewee 6

Yeah, they were testing. They were, they were, they were. Everybody was trying to be as normal as if we were still in the office. And then when we got into the office, whatever supplier was open, they were still working with. And as soon as they could travel, Vicki was on a plane and going to the factories and going wherever she needed to go.

00:24:17.660 --> 00:24:21.930

Interviewee 6

Umm yeah, she people were not like not.

00:24:19.120 --> 00:24:20.600

WU, Xiaopei [Student]

OK. Yeah.

00:24:23.950 --> 00:24:27.580

Interviewee 6

Not putting COVID ahead of the business needs.

00:24:29.720 --> 00:24:40.830

WU, Xiaopei [Student]

OK, when you put it like that, that's actually interesting to think about. I was thinking like ohh let's integrate new innovative ways of working versus like let's just try and yeah do what we used to do but.

00:24:41.550 --> 00:24:41.940

WU, Xiaopei [Student]

Umm.

00:24:41.870 --> 00:24:54.150

Interviewee 6

Yeah, they, you know, the reason one of the reasons that they actually reopened the office with a more kind of official safety protocol was because people were actually sneaking into the office to get work done.

00:24:55.770 --> 00:25:05.080

Interviewee 6

And you know, that's kind of crazy when you think about it. People were going out during a pandemic and looking for rolls of fabric so that we could make samples. It was just.

00:25:05.850 --> 00:25:12.850

Interviewee 6

And nobody was asked to do that. Everybody did it on their own. Nobody felt pressured to come into the office. Everybody you know, it's a volunteer.

00:25:13.990 --> 00:25:14.830

WU, Xiaopei [Student]

Of course, yeah.

00:25:14.190 --> 00:25:16.700

Interviewee 6

But you know, there were more people in the office than not.

00:25:17.890 --> 00:25:18.400

WU, Xiaopei [Student]

Uh-huh.

00:25:19.650 --> 00:25:24.820

WU, Xiaopei [Student]

OK. Yeah, that's really interesting. Well, I think it's in a good way like.

00:25:25.550 --> 00:25:29.500

WU, Xiaopei [Student]

People wanted I I think like fashion still requires that kind of.

00:25:31.010 --> 00:25:33.520

WU, Xiaopei [Student]

Being physically present, I suppose it's.

00:25:33.530 --> 00:25:33.870

Interviewee 6

Yeah.

00:25:34.390 --> 00:25:42.460

WU, Xiaopei [Student]

Still, it's not all it hasn't transitioned into living in the digital world quite yet, as you know.

00:25:34.680 --> 00:25:35.000

Interviewee 6

Yeah.

00:25:43.470 --> 00:25:45.970

WU, Xiaopei [Student]

Umm, OK, great. Sorry. I'm gonna.

00:25:46.670 --> 00:25:48.990

WU, Xiaopei [Student]

Now it's finally asked.

Interviewee 7:

00:00:15.690 --> 00:00:22.830

WU, Xiaopei [Student]

The first question is what do you know if anything about how artificial intelligence is being used in the fashion industry?

00:00:27.390 --> 00:00:35.050

Interviewee 7

Because it depends on what type of AI you're talking about specifically. Like, is there a certain type that you're thinking of?

00:00:37.610 --> 00:01:07.360

WU, Xiaopei [Student]

Like true like machine learning. Let's start there because I I think like with your experience and where you're working, I'm assuming or especially in SFI, feel like you're exposure would be more than a lot of the people that have so far talked to because so far just to give you some context, you have talked to most people have said they don't know much at all, right, because there's still working on very traditional type processes, in which case I think when I say the closest thing that they can talk to you in terms of digital technologies are like flow.

00:01:07.700 --> 00:01:17.670

WU, Xiaopei [Student]

Virtual sampling programs, things like that, right? But I was curious from your end. Yeah. Like what? Anything like in that range, right? Because I think like Chloe is more CAD to me.

00:01:18.450 --> 00:01:35.380

WU, Xiaopei [Student]

Still. And so I would be interested if you know anything even in the more like up and coming section like in terms of machine learning, deep learning, that sort of thing, but if not, yeah, anything whatever you think about it as like a I.

00:01:36.740 --> 00:02:04.800

Interviewee 7

Yeah, I think you know in our design and product development process, probably not so much. You know, we still work in a traditional way. We don't even use like 3D CAD close or anything like that. Although some of our vendors do, we are using certain programs and software, but those are still like pretty traditional things that are used in fashion. But on our like, I guess data science side which is not related to product development.

00:02:05.980 --> 00:02:07.470

Interviewee 7

I know that they're doing.

00:02:08.270 --> 00:02:14.430

Interviewee 7

Umm, they do a lot of work with the website in terms of like I don't know.

00:02:15.190 --> 00:02:18.780

Interviewee 7

How do we attract customers? Different customer segmentation?

00:02:20.480 --> 00:02:21.870

Interviewee 7

I know that.

00:02:22.530 --> 00:02:25.320

Interviewee 7

Their ideal state would be to.

00:02:25.940 --> 00:02:38.050

Interviewee 7

Uh use data science to figure out like how to better plan the business. So being able to better predict how many units we need, what size and it's things like that. But we haven't reached that state yet.

00:02:39.670 --> 00:02:44.860

Interviewee 7

They also want to be able to use data science to I guess.

00:02:45.800 --> 00:02:56.030

Interviewee 7

Go through returns and reviews and figure out how to better improve our products, but again, we haven't reached that state yet, so those are things that we've hoped to do, but I know that we haven't yet.

00:02:56.660 --> 00:03:08.650

WU, Xiaopei [Student]

Got it. OK. That's actually really interesting to hear cause. So can you then talk me through go back and talk me through the design process at third level in general what you know of it?

00:03:09.190 --> 00:03:09.850

WU, Xiaopei [Student]

Umm.

00:03:10.590 --> 00:03:26.820

WU, Xiaopei [Student]

And how? Especially like how different or maybe not different it would be from Tori, because obviously we both kind of know and came from that. Yeah. So like their design process from the beginning like, you know conception to whenever it gets into your hands.

00:03:27.750 --> 00:03:30.970

Interviewee 7

Yeah. So it's actually pretty similar.

00:03:31.860 --> 00:03:33.120

WU, Xiaopei [Student]

Ohh OK.

00:03:32.930 --> 00:03:38.010

Interviewee 7

I know, I think. I think you're hoping for better thing because we are San Francisco company, it's.

00:03:36.440 --> 00:03:36.730

WU, Xiaopei [Student]

Well.

00:03:37.400 --> 00:03:57.500

WU, Xiaopei [Student]

Yeah, not, I mean, not as we better just like different, I don't know. And also it's a totally not totally it's like slightly different product, right. So it's like laundry. So unless you guys yeah even that I'm not 100% of the mill you're haven't been on their site in a while but like if they've expanded into different product categories there whatnot. But yeah sorry going back to the first question if there is.

00:03:40.710 --> 00:03:40.950

Interviewee 7

Good.

00:03:58.190 --> 00:03:58.940

WU, Xiaopei [Student]

Then process.

00:03:58.800 --> 00:04:17.010

Interviewee 7

Yeah. So in terms of the design process, you know it's I'd say it's still relatively traditional. You know it starts with trend research, although everything nowadays since we have been working from home, the designers will have to do everything online versus going com shopping or they still go to Paris. But we can't do things like that anymore. So obviously everything is digital.

00:04:18.670 --> 00:04:25.360

Interviewee 7

And so that's start with trends. They'll start with materials working with our material developer sourcing with our overseas suppliers.

00:04:25.910 --> 00:04:35.460

Interviewee 7

Umm. And then they'll start by sketching, you know colors, selecting colors and then narrowing down the line based on the line plan.

00:04:36.100 --> 00:04:58.650

Interviewee 7

Umm. And development is basically the same in terms of fitting. We'll go through a lot of fits. So with intimate it's especially our brand. We care a lot about fit. So that's where we still have to be very hands on. So the designers go through a lot of fit processes, fit rounds, size sets a lot of different sizes. Sorry, kumas whining because I blocked him out of the room.

00:04:59.940 --> 00:05:00.730

WU, Xiaopei [Student]

See him.

00:04:59.980 --> 00:05:05.730

Interviewee 7

Because I have my I have my other dog ichiban sleeping right here and then you get along. So I have to like keep them separate.

00:05:06.220 --> 00:05:06.870

WU, Xiaopei [Student]

Ohh.

00:05:07.150 --> 00:05:07.800

Interviewee 7

I know it's sad.

00:05:08.100 --> 00:05:11.890

WU, Xiaopei [Student]

She finds very quiet then or like, is he more calm each one?

00:05:11.760 --> 00:05:18.210

Interviewee 7

Who did you want? Yeah, she. Oh, she's great. She's the best. She's like. She's like sleeping right now. She doesn't. She's only care about. Yeah.

00:05:13.840 --> 00:05:14.440

WU, Xiaopei [Student]

Perceived.

00:05:16.610 --> 00:05:17.020

WU, Xiaopei [Student]

Ohh.

00:05:20.610 --> 00:05:24.760

Interviewee 7

And then let's see what else I don't know. And then design process.

00:05:25.620 --> 00:05:30.220

Interviewee 7

You know, we go through lab dips, strike offs, print development, things like that.

00:05:32.660 --> 00:05:36.520

Interviewee 7

Pretty similar I'd say it. I don't. I can't think of anything that's like unique to us.

00:05:36.930 --> 00:05:37.540

WU, Xiaopei [Student]

Yeah, yeah, yeah.

00:05:37.860 --> 00:05:40.540

Interviewee 7

Likes the fitting process in terms of how many things we fit.

00:05:41.300 --> 00:06:02.670

WU, Xiaopei [Student]

What about Umm, like pain points in the just that whole process you're just talking about? What are some of the challenges like obviously a Tory one of the I think things that even still people are now talking a lot about is just the changing decisions like Tories like changing direction, how that affects everyone to like basically create a lot of liability, all that stuff, right so.

00:06:03.770 --> 00:06:07.740

WU, Xiaopei [Student]

What are some of the pain points in that process that you see?

00:06:08.520 --> 00:06:11.700

WU, Xiaopei [Student]

Umm in general, but also like.

00:06:12.490 --> 00:06:13.980

WU, Xiaopei [Student]

Related to.

00:06:14.930 --> 00:06:15.980

WU, Xiaopei [Student]

Technology.

00:06:17.910 --> 00:06:26.560

WU, Xiaopei [Student]

The use of technology right, like how has any use of technology, any form of technology right, like I suppose not not just a I if it's not really being implemented but.

00:06:27.960 --> 00:06:40.570

WU, Xiaopei [Student]

How is the implementation of technology either like help the process in any way like in that design process with designers and like for example thinking of PLM?

00:06:41.430 --> 00:07:00.060

WU, Xiaopei [Student]

You were there when we started using Wikipedia MPLM. Sorry at Tori. Right. And so you know, there was times when that whole tech pack submission process was annoying for designers because it was like admin work, whatever to them, all these like little glitchy things. Right. And so. Yeah, in the same way, I think like.

00:06:46.070 --> 00:06:46.530

Interviewee 7

Umm.

00:07:01.330 --> 00:07:11.230

WU, Xiaopei [Student]

In terms of pain points, did that ever involve like regarding like the use of technology and how it was either helpful or not helpful in the process?

00:07:11.980 --> 00:07:27.190

Interviewee 7

Yeah. Yeah, we actually did implement PLM. I helped to launch it at their love. And we, I mean, I think same pain points. We still have to be very bit administrative there. We do have our vendors in the PLM system, so that helps a bit where they can retrieve information directly in the system.

00:07:27.940 --> 00:07:28.740

Interviewee 7

Umm.

00:07:30.560 --> 00:07:43.880

Interviewee 7

Other than that, I mean that's the only system that design is using actually as PLM and then there is ohh, I forget what it was called like Muro board, our new raw materials developer just brought this in. It's like digital.

00:07:44.720 --> 00:07:47.260

Interviewee 7

Like bored, you can make visual boards.

00:07:47.880 --> 00:07:50.060

Interviewee 7

I think it's called Mirror Board, but that's an.

00:07:49.580 --> 00:07:50.000

WU, Xiaopei [Student]

All that.

00:07:50.670 --> 00:07:53.760

WU, Xiaopei [Student]

Interesting. Sorry. Don't want to interrupt, but go on. What? What?

00:07:50.880 --> 00:07:51.210

Interviewee 7

Have you?

00:07:52.650 --> 00:07:52.880

Interviewee 7

Yeah.

00:07:54.230 --> 00:08:20.160

Interviewee 7

So she she's starting to make, like, a a digital fabric library. Since you know, the designers aren't in the office all the time, they can just look at the digital library and see where materials are being used across styles. And that helps with production because then we can see we're minimums might be an issue or, you know, we're going to share materials across different categories, things like that. That, that process hasn't been fully flushed out, but that's something that it could be used for.

00:08:20.820 --> 00:08:25.930

Interviewee 7

Umm, those are probably the only two tools that I can think of besides, you know, like illustrator and things like that.

00:08:27.600 --> 00:08:42.480

WU, Xiaopei [Student]

Wait, OK, that's actually, I've haven't heard of that before. The Miro thing. Muro board thing that you were talking about? Is that something that they created themselves, like internally, or is it something they bought from?

00:08:34.270 --> 00:08:34.930

Interviewee 7

This meeting.

00:08:43.560 --> 00:08:54.630

Interviewee 7

No, it's the online website. Let me see if I can find the exact name because I can't remember. I'll. I'll look for it and then send it to you. I guess I do a like a screenshot that doesn't have proprietary information too.

00:08:50.450 --> 00:08:50.730

WU, Xiaopei [Student]

Yeah.

00:08:54.560 --> 00:09:10.860

WU, Xiaopei [Student]

Of course. Of course. Yeah. Yeah. If anything that could be helpful that you're able to send would be great. Just took an idea. Cause. Yeah. So I'm actually curious in terms of things that involve, especially like the fabric, the text style like development process, right.

00:09:12.240 --> 00:09:12.860

WU, Xiaopei [Student]

Umm.

00:09:13.520 --> 00:09:28.190

WU, Xiaopei [Student]

A specifically like for sweaters. So this person who does fabric is it yarns and fabrics or ohh wait, you guys. Sorry. Different product I'm thinking of nowhere because like with like yarns and whatnot, but for the most part it's.

00:09:29.550 --> 00:09:31.830

WU, Xiaopei [Student]

Let's think. Yeah, it's just starting.

00:09:31.390 --> 00:09:44.520

Interviewee 7

We would, yeah. I mean we use a lot of laces. So lace is a big category for type of material we use. But then we do have lounge. So we started to go more into knits and woven a very basic fabrics. You know nothing.

00:09:45.250 --> 00:09:46.040

Interviewee 7

Two exciting.

00:09:46.150 --> 00:09:46.380

WU, Xiaopei [Student]

OK.

00:09:47.160 --> 00:09:47.750

Interviewee 7

And then.

00:09:49.610 --> 00:09:54.150

Interviewee 7

Yeah, so laces would probably be our like seasonal fabrics that we look through a lot.

00:09:54.710 --> 00:10:01.000

WU, Xiaopei [Student]

OK. Yeah. Do you know much else about the digital fabric library? Like what is it?

00:10:02.940 --> 00:10:08.410

WU, Xiaopei [Student]

I don't know, like how helpful it's been, how much is being relied on really like it's because I think.

00:10:11.100 --> 00:10:27.740

WU, Xiaopei [Student]

So in my head like it's just basically your scanning what the fabric, the physical fabric you're taking your scanning a physical fabric and it's put in this place where I suppose designers can go in and access more easily. Or is it just one person that's using it? I'm not sure how much you know about. Yeah, how it's being used.

00:10:27.450 --> 00:10:36.160

Interviewee 7

There's, like I'd say, it's like different Pinterest boards. So like you have multiple boards and then you can see the different materials or you can zoom in and whatnot.

00:10:36.420 --> 00:10:43.790

Interviewee 7

Umm, so it's not the scan of the material though. I think our raw material person may eventually do that. Right now it's just.

00:10:44.810 --> 00:10:51.060

Interviewee 7

No, no, no. Like cats, I think she's been doing and then like article number supplier MQ, things like that.

00:10:51.750 --> 00:11:10.290

Interviewee 7

Uh, but our suppliers over COVID have definitely been doing more digital libraries like what you're talking about, where they will scan all their headers and send to us in a a platform and we access through a login and select through there. So that's how they've been working around not being able to visit.

00:11:11.690 --> 00:11:14.820

Interviewee 7

So that type of digital library from the suppliers specifically.

00:11:14.970 --> 00:11:24.340

WU, Xiaopei [Student]

Ohh, OK gotcha. Well, that's still somewhat interesting related to well, I'll talk. Go on next to talk about something related to.

00:11:25.250 --> 00:11:28.040

WU, Xiaopei [Student]

That which you might be able to speak to more.

00:11:30.720 --> 00:11:33.960

WU, Xiaopei [Student]

So OK. So the next question is.

00:11:35.330 --> 00:11:37.670

WU, Xiaopei [Student]

Going back to this idea of like.

00:11:38.790 --> 00:11:53.280

WU, Xiaopei [Student]

AI in the creative design process, from what you understand about things like data science like you were saying or machine learning or deep learning, how would you see that facilitating the creative design process in?

00:11:54.380 --> 00:11:58.980

WU, Xiaopei [Student]

This was in your in the world of third love, like lingerie designer.

00:12:01.170 --> 00:12:03.920

Interviewee 7

How you sorry? How was the question? How do I?

00:12:03.270 --> 00:12:09.280

WU, Xiaopei [Student]

OK. Yeah. How would you see things like machine learning, deep learning, data science facilitating, like helping?

00:12:10.620 --> 00:12:12.220

WU, Xiaopei [Student]

The creative design process.

00:12:12.750 --> 00:12:13.840

Interviewee 7

Like an ideal state.

00:12:14.460 --> 00:12:30.760

WU, Xiaopei [Student]

Yeah. Yeah, yeah, yeah, yeah. Like, well, in an I, I suppose, like in an ideal state. But based on what you know about what designers and that whole like, development team, what they their needs are. Yeah, based on like, realistically, what they need. Yeah. Whoa. How would you say?

00:12:31.490 --> 00:12:36.030

WU, Xiaopei [Student]

You can see it being useful for them in the future, yeah.

00:12:36.550 --> 00:12:37.380

Interviewee 7

Yeah, I think.

00:12:38.710 --> 00:13:04.870

Interviewee 7

Where it would be useful for product development is taking customer reviews because we get a lot of reviews, just not just on the website but through returns and things like that. And being able to take that information and and making it easier to go through for designers to see the feedback. Because right now I don't know if we do anything like that like they'll hear like one off comments from our CX team, but they don't ever get a comprehensive like.

00:13:05.590 --> 00:13:35.480

Interviewee 7

Oh, this style? You know, it consistently fits small. So that's like a sign for us that we need to, you know, increase the spec or like, I don't know, these styles, they're ugly. Like they're not selling because they're ugly. Like we don't hear these types of feedback. So I feel like a lot of the design process is still based on emotion and subjectivity from a designer standpoint of I think this will sell or I think this is going to be popular, but.

00:13:35.600 --> 00:13:38.030

Interviewee 7

It would be useful to take customer feedback.

00:13:38.490 --> 00:13:58.700

Interviewee 7

Umm. And actually apply it to design processes, because we're not doing that right now, you know, I mean, we do a little bit like we hear customer requests, but obviously everyone has a different opinion and it's difficult to get true feedback nowadays because of how much reviews are like edited and things. But that's where it could be useful I think.

00:13:59.270 --> 00:14:23.540

WU, Xiaopei [Student]

Umm. Watch it. Yeah. No, that's a really good point. And it, like aligns with a a little bit of what other people have been talking about in terms of like the answer to this question. I suppose people have been mentioning that use of being able to understand their customer better or whatnot, right. So we so at your company, would you say that they are in terms of idea concept, they're very driven by.

00:14:25.790 --> 00:14:29.810

WU, Xiaopei [Student]

Like the merch needs of it in terms of OK, we need to make sure.

00:14:30.420 --> 00:14:50.660

WU, Xiaopei [Student]

Umm, you know, whatever sold well last year. That's an indicator. And so we have to kind of go and meet that versus like creating something completely new and creative, right? So they are they're also in very similar to how they were in Tory in terms of like looking at past data and trying to like meet what they know about the customer and what will sell.

00:14:51.430 --> 00:15:01.580

Interviewee 7

Yeah, yeah, I think also because, you know, we don't have that many styles. We are still we are trying to expand the product line to offer different solution based bras.

00:15:01.660 --> 00:15:25.060

Interviewee 7

Umm, So what the merchandising team has been doing recently and we actually didn't have a merchandising team until like a year ago. So it's still like a new department for us, but the merchandising team has been taking like they do a lot of com shopping as well online to see what other brands are offering and what they're launching. So we take that feedback to then you know, direct where we'll go with our products.

00:15:25.300 --> 00:15:43.910

Interviewee 7

Umm, but again, that's also very manual. So I think that could be an opportunity for merchandisers in terms of market research, understanding what different brands are offering at what a given time you know because they have to go through and like how many skews are there, how many styles on the website do they have just based on the other brands websites.

00:15:44.210 --> 00:15:46.550

WU, Xiaopei [Student]

Right, right. Gotcha. OK.

00:15:47.750 --> 00:15:54.760

WU, Xiaopei [Student]

Umm, so next I'm just gonna this is sort of just the last part. I'm gonna share a screen with you.

00:15:55.860 --> 00:16:00.890

WU, Xiaopei [Student]

And this is just like a hypothetical process regarding.

00:16:02.970 --> 00:16:06.510

WU, Xiaopei [Student]

Fabric design UM here.

00:16:07.240 --> 00:16:07.600

WU, Xiaopei [Student]

OK.

00:16:10.100 --> 00:16:12.860

WU, Xiaopei [Student]

That's just my shared screen.

00:16:14.080 --> 00:16:25.330

WU, Xiaopei [Student]

So this might take you a little bit. This is related to nits, like like the knitted swatches, but you could ignore that, right? So actually, based on what you were talking about, just imagine this being like a fabric.

00:16:26.060 --> 00:16:50.800

WU, Xiaopei [Student]

Uh, something that would help develop fabric designs that say, you know, in the digital library for the board, the mood board that you were talking about, the digital Mood board or something like that, right. So let's like relate it to that. But hypothetically, if there was like a system or a program that would allow designers or like an R&D fabric person to be able to input, say.

00:16:51.660 --> 00:17:13.750

WU, Xiaopei [Student]

Umm some attributes, right? So like some inspiration images and then some of the things that they need it to represent, right? So in terms of what kind of yarn they would want, maybe like the gauge or whatnot or, you know, the yarn count, whatever it is, right, the fabric will even whatnot. And then for the computer to be able to based on like.

00:17:14.420 --> 00:17:19.030

WU, Xiaopei [Student]

Deep learning machine learning to be able to generate a creatively generate.

00:17:19.930 --> 00:17:24.960

WU, Xiaopei [Student]

New fabric designs based on those needs, right? And those would be based on like.

00:17:25.910 --> 00:17:53.680

WU, Xiaopei [Student]

The machine learning or whatnot would be trained based on data that's provided from previous seasons or whatnot, so it's kind of learning right as you go along. Learning from what was in what was not and whatnot right and so and then from that you would get these creative designs that not necessarily would be used, but it would be an way for them to generate ideas and inspiration and whatnot. And then since it's already in digital format, it could potentially be used towards.

00:17:55.570 --> 00:18:08.220

WU, Xiaopei [Student]

Virtual sampling and things like that. But of course, like you're saying, it's not currently being used there. But this is sort of like a hypothetical idea. So based on this sort of hypothetical program process, right and.

00:18:09.030 --> 00:18:31.580

WU, Xiaopei [Student]

Do you think it's something that you see that's like 2 two novel in a way like it's too far for them? Like they you don't see based on the way designers are now working, you don't see it being that realistic of them to adapt to or do you think it could be helpful in any way for like their work efficiency for their creativity to reduce sampling? Like do you think?

00:18:32.960 --> 00:18:36.890

WU, Xiaopei [Student]

Yeah, something like this. This kind of concept of this.

00:18:38.790 --> 00:18:49.520

WU, Xiaopei [Student]

Computational tool that can facilitate textile and fabric design would be at any in any way like helpful for their creative process.

00:18:50.830 --> 00:18:51.680

Interviewee 7

Yeah, I think.

00:18:52.880 --> 00:19:26.150

Interviewee 7

So like the first two steps where you like specify attribute and then you get the computer generated digital swatches. I think that's definitely useful for designer because then they could narrow down the type of fabrics or laces that they want. Let's say they're looking for a crochet or bohemian, then it could at least more quickly and more efficiently narrow it down for them. Of course, this would have to live in some type of library that I don't know. Who would have such a thing, or if there is such a thing that exists right now, but in current state I would say he's designers are still very hands on.

00:19:26.240 --> 00:19:36.600

Interviewee 7

They have to, like, touch and feel and put things on in order to make a decision. From what I've seen, at least, at least the traditional designer, maybe a more, you know, forward thinking designer would be into something like this.

00:19:38.300 --> 00:19:48.790

Interviewee 7

Where I could see it this actually being useful is like the metaverse. Actually, I know if you've explored metaverse fashion and how that's being developed, but I could see something like this being used there for sure.

00:19:49.880 --> 00:19:52.170

WU, Xiaopei [Student]

Umm, yeah, yeah, I definitely AM.

00:19:53.380 --> 00:20:11.030

WU, Xiaopei [Student]

To your point, yeah, with the whole idea of even gaming skins, all that in terms of, yeah, that could also be a really just potential future use. That's a good point. But yeah, we based on what you're saying, I was also thinking of asking.

00:20:12.070 --> 00:20:16.120

WU, Xiaopei [Student]

Umm, the the question kind of get my mind, but yeah.

00:20:17.350 --> 00:20:20.600

Interviewee 7

Look how they look at things.

00:20:22.270 --> 00:20:23.070

WU, Xiaopei [Student]

Yeah.

00:20:24.030 --> 00:20:24.650

WU, Xiaopei [Student]

I think so.

00:20:26.250 --> 00:20:28.750

WU, Xiaopei [Student]

Because you were mentioning the process being.

00:20:31.280 --> 00:20:36.760

WU, Xiaopei [Student]

Uh, I'll come back, but it might come back. OK, but yes, that's good to know, I think.

00:20:38.290 --> 00:20:41.800

Interviewee 7

Yeah, I think a lot of things with material, like if if you're doing something like.

00:20:42.670 --> 00:20:44.580

Interviewee 7

Where a material is very.

00:20:46.130 --> 00:20:46.890

Interviewee 7

I don't know. Like.

00:20:47.640 --> 00:20:53.670

Interviewee 7

Like the characteristics are very unique and like you can see the texture and all that it's.

00:20:54.440 --> 00:21:15.260

Interviewee 7

Definitely helpful, but something like for example we use a different lot of different microfibers. It's just nylon spandex blends like you can't see that on a screen. You can't see. The different. You can't feel it. The hand feels so you don't know how it's going to feel against the skin, which is important for our type of product. Especially. So that's where it would be difficult in a digital format.

00:21:16.230 --> 00:21:45.080

WU, Xiaopei [Student]

Totally. Yeah. Yeah. No, that's like a huge point. I think with this whole concept of using, of dealing with fabrics through, like digitally and like kind of creatively designing them digitally is like the handfield part. Well, do you know if they either the fabric R&D person or the designers, the whole process with working with suppliers and mills for fabric, do they still for example request mill card, do they go to?

00:21:46.240 --> 00:21:48.750

WU, Xiaopei [Student]

Yarn show not Yan show. Sorry fabric shows.

00:21:50.050 --> 00:21:56.050

WU, Xiaopei [Student]

The same way that they did at Tory. Do you know how? Yeah, they collect inspiration.

00:21:54.850 --> 00:22:00.090

Interviewee 7

Yeah. Yeah. And you still we get we ask for hangers, so Mills will send hangers in the mail.

00:22:00.250 --> 00:22:24.090

Interviewee 7

Uh, we do have, like, not a huge library, but we started consolidating hangers at the office. So we still we have like an area that's like the fabric library. But I would say you know, we're always looking for like what's new in the market. So suppliers will still send their binders or their books to us. And then I think actually supplier business are starting to happen again as well. So they'll come to visit us at the office.

00:22:24.710 --> 00:22:38.680

WU, Xiaopei [Student]

OK, got it. And then today, so Speaking of like this whole pandemic mode of working, did that change their creative design process like what kind of technologies do you think they involve more during over the pandemic?

00:22:40.730 --> 00:22:42.210

Interviewee 7

Pliers or designer? Both or.

00:22:42.810 --> 00:22:48.730

WU, Xiaopei [Student]

Uh designers or suppliers? If you saw like, think, yeah, them doing things differently to facilitate.

00:22:49.950 --> 00:23:08.540

Interviewee 7

Yeah, with designers, I mean, they definitely have to have to be a little bit more digital. And in looking at the supplier like hangers, cause I remember it used to be literally the suppliers were come visit us and they would have suitcases full of hangers. But now during the pandemic, they had to switch to digital libraries and just send us a link.

00:23:09.110 --> 00:23:15.660

Interviewee 7

Uh, so then designers had to select their their laces based on just looking at a photo or an image.

00:23:09.120 --> 00:23:09.420

WU, Xiaopei [Student]

Hmm.

00:23:16.840 --> 00:23:19.840

Interviewee 7

And then, but then they would of course, still ask for the hanger later on.

00:23:21.140 --> 00:23:22.110

Interviewee 7

And then.

00:23:23.230 --> 00:23:35.890

Interviewee 7

Designers also, I think relied more on CAD work, whereas before they were doing a lot more hand sketching because they could sketch through things in person. You know, working with other designers. But at home they had to.

00:23:36.600 --> 00:23:48.670

Interviewee 7

Do a CAD and present the CAD and you know in the virtual format because we were on Google meets so they had to be able to present it on a screen, you know in a way that's understandable for leadership teams and other teams so.

00:23:49.420 --> 00:24:08.020

Interviewee 7

That kind of helped with efficiency, but otherwise fittings I mean we did do virtual fittings like I would sit here and literally just watch, but you can't really see much from the screen. So we were doing virtual fittings for a while, but a lot of things have gone back to office because the team is going in twice a week now. I think one to two times a week.

00:24:08.480 --> 00:24:08.930

WU, Xiaopei [Student]

OK.

00:24:09.160 --> 00:24:12.180

Interviewee 7

It's almost going back in a way, but they've kept something, see?

00:24:13.120 --> 00:24:13.510

WU, Xiaopei [Student]

OK.

00:24:15.240 --> 00:24:15.690

WU, Xiaopei [Student]

Gotcha.

00:24:17.110 --> 00:24:21.870

Interviewee 7

Yeah. Oh, and that website is Miro. I'm IRO.

00:24:22.680 --> 00:24:23.730

WU, Xiaopei [Student]

OK, wait, let me.

00:24:25.620 --> 00:24:26.060

WU, Xiaopei [Student]

Just do.

00:24:27.580 --> 00:24:29.420

WU, Xiaopei [Student]

Came up mural board, right?

00:24:30.520 --> 00:24:36.730

Interviewee 7

Yeah, I just called. It's just Mir, though, and you can have like, a few different free boards and then you.

00:24:33.110 --> 00:24:33.520

WU, Xiaopei [Student]

Ah.

00:24:37.520 --> 00:24:39.670

Interviewee 7

Pay money if you want like more, yes.

00:24:40.510 --> 00:24:45.990

WU, Xiaopei [Student]

Interesting. Got it. OK, so put it up. I'll look at it into it. It's interesting. It says it's for like.

00:24:47.430 --> 00:24:51.540

WU, Xiaopei [Student]

Like you can make it into a white board. It's not necessarily like creative force, but it.

00:24:52.050 --> 00:24:57.070

WU, Xiaopei [Student]

Uh, like there's different types of you can do mind maps and brainstorming, OK.

00:24:56.930 --> 00:25:04.150

Interviewee 7

Yeah, yeah, I'd say it's more for that. I mean, I could you want me to show you, like an example you're curious about that. Let me see. I'll just do.

00:25:03.630 --> 00:25:06.690

WU, Xiaopei [Student]

Yeah, if you are good to share it, that's.

00:25:07.090 --> 00:25:08.510

Interviewee 7

Yeah. Let me find me, that's.

00:25:07.990 --> 00:25:17.410

WU, Xiaopei [Student]

It's cool to that they're using it creatively, but it's funny like they found something that was, again, not necessarily for boards, and they adopted adapted it to.

00:25:18.080 --> 00:25:20.840

WU, Xiaopei [Student]

Their needs that way seems right.

00:25:21.750 --> 00:25:22.800

Interviewee 7

Yeah, it.

00:25:26.690 --> 00:25:36.980

WU, Xiaopei [Student]

Yeah, because it looks like here like almost like, like post it notes on a on on the screen, but I suppose you guys are using it creatively more, which is cool.

00:25:31.220 --> 00:25:31.770

Interviewee 7

Exactly.

00:25:37.800 --> 00:25:39.440

Interviewee 7

Yeah. So our can you see this?

00:25:40.030 --> 00:25:43.380

WU, Xiaopei [Student]

Uh, let's cut it. Yeah, yeah, yeah.

00:25:43.770 --> 00:25:50.720

Interviewee 7

So yeah, I guess our developers she'll put like all the different cads we've received and then she'll do post-its and things like that and then.

00:25:52.150 --> 00:25:52.840

Interviewee 7

Try not to.

00:25:53.770 --> 00:26:01.220

Interviewee 7

She put all our different bras here and the different materials so that she could organize it by the different materials.

00:26:03.000 --> 00:26:06.410

Interviewee 7

Yeah, things like that. So yeah, it's not specific for.

00:26:08.060 --> 00:26:12.470

Interviewee 7

Materials, but for yeah, I guess it's just brainstorming whiteboards.

00:26:13.820 --> 00:26:14.350

WU, Xiaopei [Student]

Yeah.

00:26:15.070 --> 00:26:15.820

WU, Xiaopei [Student]

Well, I mean.

00:26:16.790 --> 00:26:18.240

WU, Xiaopei [Student]

It would be interesting if.

00:26:19.620 --> 00:26:40.510

WU, Xiaopei [Student]

Like thinking about back in the day, it's like PDM had that aboard type function that would like automatically take, like, all the stuff they put in the tech packs and put it in that in a way that it was easier for them to generate bores versus like, working on those, you know, those physical huge, like bulky things behind them. Yeah, that sort of thing. But yeah. OK.

00:26:40.380 --> 00:26:49.780

Interviewee 7

This is the change too. We we did stop using those giant pin. Well, I think design still uses those like pinboards, but the in terms of presentation now they've gone all digital.

00:26:50.710 --> 00:26:59.300

WU, Xiaopei [Student]

Wait, so I was curious. So when you say they gonna do the, how do they like project it? So that's big enough for everyone to see or whatnot. Like how does that?

00:27:00.180 --> 00:27:08.280

Interviewee 7

I mean, it looks like a line sheet, but they'll just have like all the cats and then they'll have like little squares with all the different color offerings. So it's really just cads.

00:27:08.920 --> 00:27:09.300

WU, Xiaopei [Student]

Ah.

00:27:09.370 --> 00:27:20.490

WU, Xiaopei [Student]

OK. And then when people ask for like what like they when they want to understand the fabric better cause like unlike before they could pin like the swatches on you can go touch it. So how does it work?

00:27:10.160 --> 00:27:10.580

Interviewee 7

Yeah.

00:27:21.410 --> 00:27:26.640

WU, Xiaopei [Student]

When you see a digitally, is there like a fabric book next to it or whatnot?

00:27:26.340 --> 00:27:37.380

Interviewee 7

No, I don't think they'll make like a tiny board, which just like a little Swatch of the fabric. And then we do have samples too, because we when we do like adoption like final line adoption, we actually do that in person. We all go to the office for that.

00:27:29.790 --> 00:27:30.930

WU, Xiaopei [Student]

OK, OK.

00:27:37.620 --> 00:27:37.830

WU, Xiaopei [Student]

OK.

00:27:38.530 --> 00:27:41.580

WU, Xiaopei [Student]

Ohh, our instinct ever is anything ever sold off a cat?

00:27:38.640 --> 00:27:39.050

Interviewee 7

Yeah.

00:27:43.030 --> 00:27:47.420

WU, Xiaopei [Student]

Or is it still like too much? Relying on samples for the most part like?

00:27:43.940 --> 00:27:44.320

Interviewee 7

Uh.

00:27:48.890 --> 00:27:49.380

Interviewee 7

We've.

00:27:50.880 --> 00:27:53.320

Interviewee 7

Training. Yeah, generally we have.

00:27:52.660 --> 00:27:57.620

WU, Xiaopei [Student]

Or approved not sold to necessarily, I think approved off a CAD. I suppose you guys are more private.

00:27:57.230 --> 00:28:10.420

Interviewee 7

Yeah. No, no, I know what you mean. I would say yes, in our company just because our merchandiser lives in New Jersey and our designers are in San Francisco, so they've.

00:28:11.210 --> 00:28:15.030

Interviewee 7

They've bought things without seeing a full sample before.

00:28:16.000 --> 00:28:16.450

WU, Xiaopei [Student]

OK.

00:28:16.010 --> 00:28:18.150

Interviewee 7

We're better. I think we're better about that than other companies.

00:28:19.070 --> 00:28:36.000

WU, Xiaopei [Student]

Got it. And that was even before the pandemic. You feel like they were open to that? Or is it because I know a lot of people are like ohh now open to that cause pandemic and they had to kind of make decisions off cats. But you feel like they were just open to that because.

00:28:37.380 --> 00:28:42.110

Interviewee 7

I think it's improved. Yeah, I think it probably more open now than before the pandemic for sure.

00:28:42.610 --> 00:28:42.990

WU, Xiaopei [Student]

OK.

00:28:43.780 --> 00:28:44.010

WU, Xiaopei [Student]

But.

00:28:44.980 --> 00:28:50.830

WU, Xiaopei [Student]

Alright, I think like, yeah, there was some great talking points I can. I'm gonna stop the recording. Yeah.

00:29:11.700 --> 00:29:20.990

WU, Xiaopei [Student]

Stop being this so that the file isn't as big. I wanted to include like industry input right? Like because a lot of.

00:29:22.740 --> 00:29:38.420

WU, Xiaopei [Student]

Research has been done in the past regarding this developing. Whatever AI technologies for the fashion creative design process, they rarely speak to industry experts and I thought that that was like really helpful and it's been really actually illuminating because I think I assumed.

00:29:39.090 --> 00:29:42.250

WU, Xiaopei [Student]

I seemed a lot of things. I assumed a lot of things would have changed.

00:29:43.100 --> 00:29:45.370

WU, Xiaopei [Student]

And I assumed.

00:29:46.340 --> 00:29:53.750

WU, Xiaopei [Student]

Like this idea of AI in the fashion industry? Not that it would really be embedded in the system. I definitely didn't think it was being used a lot, but at least.

00:29:54.590 --> 00:30:15.600

WU, Xiaopei [Student]

There is more buzz about it, but then yeah, it's just been really interesting and surprising and like revealing in a lot of ways. So this has been really helpful. Yeah. And hearing just people talk about slightly different iterations of the process and whatnot. But yeah, I think the funniest thing is that, like, the things that are the same, especially talking to or no current Tory people, slash X Tory people.

00:30:17.190 --> 00:30:24.450

WU, Xiaopei [Student]

Sorry, especially current Tory people like how a lot of things are the same. I don't know if you're still in touch with anyone.

00:30:24.070 --> 00:30:29.710

Interviewee 7

I haven't thought. Yeah, I haven't talked to anyone. I mean, I follow some people on Instagram, but it will chat like there, but not about work or anything. Yeah.

00:30:29.750 --> 00:30:33.440

WU, Xiaopei [Student]

Oh yeah, yeah, yeah. But anyways, it's just like it's been.

00:30:33.160 --> 00:30:33.990

Interviewee 7

Still his name?

00:30:35.290 --> 00:30:37.660

WU, Xiaopei [Student]

Yeah, it.

00:30:37.240 --> 00:30:41.910

Interviewee 7

I think every companies like that though, like the longer you like, even you know my company now.

00:31:34.680 --> 00:31:43.800

WU, Xiaopei [Student]

I'm gonna record I need to record you saying that or at least cause this transcription thing is basically my notes, but I wanna record or I'll just like.

00:31:44.670 --> 00:31:58.980

WU, Xiaopei [Student]

Repeat that you just said that it's really hard to get data scientists currently still right, cause like in my head, that's what everybody cause. It's been such a again buzzword and it feels like that's what everyone's especially down in SF like.

00:32:00.510 --> 00:32:19.430

WU, Xiaopei [Student]

It's a major need, so I would assume like there's tons of people flocking to that, but it's still like you're saying it's still hard to find them. Is it hard because it's like they are not going to companies like necessarily fashion retail companies and you make they're probably wanting to go to like Google or whatever to work for them. Like when you say it's helped to get data scientists.

00:32:19.830 --> 00:32:39.930

Interviewee 7

Yeah. I think part of it is that the, you know, the competition for data science tests, there's huge. You know, they have to pay them a huge salary just to attract them. And we're a smaller company. So and it is a very specialized field. Like, I'm not sure how many people really studying it, you know, back in college, you know, this is more of a new field in a way.

00:32:24.470 --> 00:32:24.790

WU, Xiaopei [Student]

Ohh.

00:32:28.710 --> 00:32:29.090

WU, Xiaopei [Student]

No.

00:32:40.510 --> 00:32:48.060

Interviewee 7

Umm, it was like basically how like engineers are were highly sought after in the early what is? I don't know like 2000s or.

00:32:48.560 --> 00:32:48.860

WU, Xiaopei [Student]

Yeah.

00:32:49.970 --> 00:32:55.620

Interviewee 7

But yeah, the competition to find talent is hard. And then I don't know about.

00:33:00.520 --> 00:33:01.150

Interviewee 7

Funny.

00:33:02.370 --> 00:33:08.640

Interviewee 7

Be a data scientist. You have to be very like, like you're literally just about the data. You're about the facts, right? But.

00:33:09.340 --> 00:33:23.780

Interviewee 7

Sometimes, maybe, oftentimes, leadership doesn't necessarily take those facts and implement on them right, because leadership teams are still leadership teams and they'll still make decisions based on what they think is best for the business. So that can be probably frustrating for data scientists.

00:33:24.560 --> 00:33:25.560

Interviewee 7

At least from what I've seen.

Interviewee 8:

00:00:02.750 --> 00:00:12.780

WU, Xiaopei [Student]

Yeah, it's starting. OK, great. So the first question is, what, if anything, do you know about how artificial intelligence is being used in the fashion industry in general?

00:00:14.490 --> 00:00:33.580

Interviewee 8

But that that you know, when we look at artificial intelligence, such a it's it's quite honest, this is very broad word, right. But let's let's if you if you move it down into smaller bits, you know part of you know the big under the big umbrella of artificial intelligence, you have things like machine learning.

00:00:34.540 --> 00:01:08.010

Interviewee 8

All right. And uh data, that's that's basically of course fueled by data. And so I think in that in and then of course image recognition that is becoming a big part also in, in the whole artificial intelligence space. So you do see a lot of of this from front end you know and and let's say for search engine through image recognition through data you know your click throughs and all that that's already kind of shaping and and developing almost say.

00:01:08.120 --> 00:01:18.150

Interviewee 8

You know choice, you know, offering choices to you, helping you find things a lot better. You start to see a lot of this. And in terms of product development.

00:01:18.960 --> 00:01:26.430

Interviewee 8

Actually, it's very interesting because a lot of the thoughts that are coming into it is, you know, can you use artificial intelligence for?

00:01:27.270 --> 00:01:57.430

Interviewee 8

Design development you know? Because why? Because if in the front end of paying the go to market in the front end of consumer engagement itself, it's already so packed with you know how how consumers are being led and all. So for brand retailer and for design developers and all that, can you take a lot of the front end type of way that's already a shape that's already a focus that's already kind of shaping you know moving navigating them through certain things.

00:01:57.530 --> 00:01:59.200

Interviewee 8

So how do you use that then?

00:02:00.020 --> 00:02:31.030

Interviewee 8

You know, knowing uh how designers or or knowing what's happening with uh with front end consumers. How are you bringing that backwards? And then also taking that information backwards to start redeveloping in the fashion world itself, it's no, no, it's seldom that people really creates from zero. I think that's maybe 1% of the industry's most of the industry work of a base. So if the front itself is already navigating consumers or understanding.

00:02:31.390 --> 00:02:33.520

Interviewee 8

Where the consumers base is.

00:02:34.530 --> 00:02:37.300

Interviewee 8

The back end should also have the same information.

00:02:38.260 --> 00:03:09.470

Interviewee 8

And when you have start having the same information of base what people like and what people don't like, that's where your that's where your design and development, you know using the same it's it's a broad based umbrella still there's base of umbrella under AI to start thinking to start giving you already this is what people want and this the styles and this is where you pick it up from. So for us when we are leading some of our clients and into their projects and all.

00:03:09.570 --> 00:03:27.810

Interviewee 8

It's about building this foundation, you know of digital assets that you could do something with that you know that with machine learning and and with data and all that can be pooling things up so that you are not redoing, you're not starting everything from scratch. I'll give you an example.

00:03:28.840 --> 00:03:56.240

Interviewee 8

About 5-6, maybe about seven years ago, I I I spoke to one of the owners of a of a factory and and he was just at the start. He was looking at digital transformation. And my first question to him is tomorrow if you get a tech pack from a brand new customers, you know, what's the first thing that you do in design and development? And he says, well, I I thought about it. It's like OK, customers give me a tech pack. I sent it to the pattern.

00:03:57.030 --> 00:04:04.300

Interviewee 8

Alright. And we start to, uh, sample room, we start making a sample. So I said. But you've been in business for 40 years, you're still in a woven business.

00:04:05.030 --> 00:04:10.320

Interviewee 8

8090% of your business is in bottoms after 40 years. Where's your base?

00:04:11.040 --> 00:04:17.320

Interviewee 8

Why are you not starting from a base and you and and you are studying from going back to zero and he's like.

00:04:18.410 --> 00:04:21.740

Interviewee 8

I don't. I can't answer because we never thought about it this way.

00:04:23.890 --> 00:04:39.700

Interviewee 8

Right. So if you think about it with the amount of data that can already start helping design A designers drive, you know, even things sustainable choices, what's out there, what do you do, what's people's preference?

00:04:40.840 --> 00:04:53.620

Interviewee 8

Download that uh designers should actually be using such information to actually start and and pooling things that they already have to start driving. Now, where does this come from? This doesn't come from a designer understanding how to do it. This come actually from.

00:04:54.280 --> 00:05:16.510

Interviewee 8

You know, AI type of platforms and all that they can actually bring all this up and say here, here's your first. Here's your base. Or here are some of the base that you should be starting based on this week's insights from consumers. And if you you're planning to produce this collection, you know for you know, for, for, for to be out, you know in three or four months.

00:05:17.600 --> 00:05:18.490

Interviewee 8

This is where.

00:05:19.530 --> 00:05:24.850

Interviewee 8

Information is leading us to on where the trend is. This is what you have done in the past.

00:05:25.730 --> 00:05:34.050

Interviewee 8

Pulling this out and this is your starting base, we are not. We're not. I actually, we live in a world where this can actually already happened.

00:05:34.500 --> 00:06:05.090

WU, Xiaopei [Student]

Yeah, for sure, actually. So what you're saying is really great cause it aligns with a lot of when I'm asking the creative designers who, if I asked them where they think they need more digital, like facilitation, right. And it's not. I obviously for them because they're the to people, they don't necessarily want anything to take away doing the creative work, right. But it's exactly a lot of quite a few of them have mentioned.

00:06:05.450 --> 00:06:15.870

WU, Xiaopei [Student]

The need for understanding the customer better, right? If there was something that would make that process more, clarify, more clear and stuff. So yeah, to your point, I think that's like.

00:06:17.300 --> 00:06:36.500

WU, Xiaopei [Student]

Really allies with what they're saying. So then going off of that, I was just wondering what you mentioned like you were saying in your particular company, you're thinking about ways to kind of like gather that information and feed it to design or whoever's using the programs in a way that they don't really have to think about. But it's like kind of provided. So they're they're integrating like.

00:06:36.660 --> 00:06:43.150

WU, Xiaopei [Student]

Umm what? I mean without telling me too much about that? How you've or if it's sort of in work.

00:06:44.780 --> 00:06:46.420

WU, Xiaopei [Student]

Those sort of features.

00:06:47.690 --> 00:06:57.690

WU, Xiaopei [Student]

Do you see it being like, are people very receptive to it or like, what do you see the impact being so far or I don't know if it's been implemented, how much if it's been implemented yet?

00:06:58.440 --> 00:07:27.510

Interviewee 8

In in broad you you know the creative process will be there, but a lot of the designers or a lot of design designers or developers work, you know, creative work itself. Today when they work in an enterprise or when they even do some of their own businesses or launching their own brands, I would say the creative and development process has about 60 to 70% that are not creative work, OK has nothing to do with creative work.

00:07:27.740 --> 00:07:43.980

Interviewee 8

And that's where AI and and I think that's where out of shun intelligence systems and all like our like us you know we develop things to take away not to take away creative as but to take away the non creative part so that you give time back.

00:07:44.630 --> 00:08:15.020

Interviewee 8

To the designers and all. So I this is this is actually really well received by people who work along with us. Uh. Of course we didn't. You know this. These are things that we've worked with with, with customers along the the years, right for for a couple of years to actually have this type of start with this type of philosophy which is to give time back so that you have creative and I take away and I take the work that is really non creative all right and I and I use.

00:08:15.330 --> 00:08:45.770

Interviewee 8

Systems automation, you know, whether it's powered by machine learning, whether it's powered by it doesn't matter. I use those technology to basically do the work that the non creative. Therefore I give time back to you. This has been actually it has been really well received. So not looking at for example browser has a lot of technology, right. But we are generally we are when designers and all that know us they know us from a tool level in the tool itself is not.

00:08:45.850 --> 00:08:49.830

Interviewee 8

It's not. This isn't. It's just the start of this entire concept, alright.

00:08:50.090 --> 00:09:08.300

Interviewee 8

Ohh it's the the the start of this entire transformation. I wanna say it's a concept because there's a transformation. All right? So at the tool level, when you're starting out, you may not actually you may feel that. Oh, I'm starting to learn a lot. Whilst I used to sketch and now when I'm starting to.

00:09:09.500 --> 00:09:26.490

Interviewee 8

Uh, go into 3D? I actually have to use not just my sketching abilities. If I'm a designer with the left brain, right brain, I actually I'm starting to develop an entire government that actually takes me more time because today I only sketch and I throw it to some factories or I throw it to someone else.

00:09:27.430 --> 00:09:55.190

Interviewee 8

From that point of work, from that point of view, it may seem that hey, it might. Starting base is me actually devoting more time to do things that I don't normally do. But if you then look at what very quickly happened after 1-2 months as you build that library again that, that foundation that we talk about, then your your links as you do the work, you what happens is that you your base is going, your base is going to start fueling how you work in the future.

00:09:56.130 --> 00:10:24.270

Interviewee 8

Alright, so at the tool level, when you learn, it may seem that, but when you piece all the the other technologies all pretty much together, you know this is where you start to understand how digital you know and all you know the whole artificial intelligence can really give can really impact by giving time back to you because you're not, you're not doing the things that you transactionally you have to do colors, colors, colors, rendition for example, right.

00:10:24.680 --> 00:10:25.500

WU, Xiaopei [Student]

Tell her what, sorry.

00:10:26.270 --> 00:10:47.060

Interviewee 8

Colors you know to to basically render many, many colors. It's it's one that I hear most designers. They are like man, some merchandisers come and they don't like all the colors and then they're making this redo it again. And I had to redo everything. You know that there are companies out there today that all this work is done through machine.

00:10:48.210 --> 00:11:20.320

Interviewee 8

You know, so you feed the colors through and all the renders and all that automatically done by the server is not even done by human being. They take all the colors, they take all the styles, and then they, yeah, they just go silly multiplying it and all at the end of the day is not even the designers anymore. It's the designers plus the merchandisers who just look through the hundreds of, you know, and thousands and then pick up what they want and put it into a collection. It's no longer sitting there trying to think of it. This is all things that is.

00:11:20.740 --> 00:11:26.330

Interviewee 8

That are pretty much done by, yeah, by by systems today.

00:11:26.840 --> 00:11:56.000

WU, Xiaopei [Student]

Yeah, yeah, yeah. So what about? So now they're like, one of the feedback that people have talked about, actually, regarding using virtual sampling programs or any kind of lots of types of digital technology in the beginning point, is that like a lot of designers who are used to working the traditional way, they can't not have physical things, right, like swatches, especially in knitwear, right where it's so it's such a tangible spatial thing that you need to interact with. So.

00:11:57.160 --> 00:12:09.080

WU, Xiaopei [Student]

With this sort of challenge, like, do you think it's like one of the biggest barriers for people really embracing more digital technologies or even like AI?

00:12:10.390 --> 00:12:24.950

WU, Xiaopei [Student]

And like bullets stop you from saving that time because, like, yeah, it's supposed to facilitate saving time. But then if you're still relying on, like, I need a physical sample, then you're still waiting for the whatever. Two weeks for someone in China to send it or whatnot. So, yeah, what is through you on that whole?

00:12:26.230 --> 00:12:35.660

Interviewee 8

Well, I've seen designers being very conscious of we have designers on our part on our team, right? So we have uh people who join us, you know, I I would say.

00:12:37.350 --> 00:12:42.730

Interviewee 8

Labs are 3040% of the company is made of people from the industry itself.

00:12:43.600 --> 00:12:59.530

Interviewee 8

And I have pattern developers. Designers will say that they're never going back to the old way of working. Why? Because they figured that ohh this is this is, you know, done it. Enough time to realize that hey, the the physical samples that comes in looks exactly the same as.

00:13:00.220 --> 00:13:16.610

Interviewee 8

The the additional the it's a digital twin. It's not a a completely different thing and they are doing you know they they play around with the machine. So they actually using physical and physical swatches and then putting it on machine and turning it digital and see they have that much.

00:13:17.530 --> 00:13:26.660

Interviewee 8

Exposure and and am experience with that that this thing about samples doesn't even cross their mind after a while, especially when.

00:13:27.490 --> 00:13:37.640

Interviewee 8

Time is short that they have to rush to or or they have to figure things out very quickly. It's no longer that and and of course, the last two years of COVID have pretty much.

00:13:39.090 --> 00:14:10.260

Interviewee 8

Help people to see there is a there is a real limitation on samples or physical world. Now I am not for taking away samples 100% and all that not because I don't believe it, but because I know it's when you start off in digital you need to have you need to gain that trust. You need to build that trust, all right? And you need to have that security blanket as you journey along, you know, at the end of the day, transformation is about people. It's not about machines and all that machines and all that's enabling this journey.

00:14:10.380 --> 00:14:40.370

Interviewee 8

It's here. The states are going away alright, but the people are the ones who have to work with technology. So when I say that I am not for, I tell them, you know, I'm not for taking away everything I'm saying. You live in this world as converge of the physical and the digital on the artificial and you move along and you see you make decisions for yourself of what will be best for yourself. What will help you, you know and what I've seen in a lot of our team.

00:14:40.660 --> 00:14:48.810

Interviewee 8

Is because they worked in. Naturally, they worked with process, so they work with both of this world. They work with the clients physical and they work in a digital.

00:14:49.900 --> 00:15:11.380

Interviewee 8

That this world has converged, that they've made decision to say I don't do it this way. I I. In fact I would not work in the 2D way anymore. I would work in this way simply because it's faster and and I have paid all the other things they've figured out the workflow. They figured out what works for them, you know, to do the work. And I think that and for anyone and barking.

00:15:12.590 --> 00:15:19.970

Interviewee 8

On the transformation, which is almost mandatory these days, alright, why do I say this? The world's not going back to.

00:15:20.700 --> 00:15:45.610

Interviewee 8

Uh pre COVID alright, which means that you gotta live with the reality that you may not have China for you know if they decide you know 1-2 months you know and then and you're gonna sit and wait for your job, you know you gonna sit and wait for things to happen in 1-2 months later. No. You gotta figure things out. And when things when tools systems are available for you learn to use them.

00:15:46.470 --> 00:15:58.950

Interviewee 8

You know, machine is not the master of the craft. The craftsman's gonna use the machine or or gotta use the automation and artificial artificial intelligence to help them to do their work better.

00:16:00.310 --> 00:16:29.180

WU, Xiaopei [Student]

Do you, would you say? I think that's really interesting. Like earlier you also said this like once people start using it then they realize like ohh this can really change and then it's not so much. Yeah. I think the initial entry is really difficult for a lot of people to embrace at first or yeah. It's just like that small little barrier and then it's just I think like also with the younger generations who are probably they're already learning this in school. It's like more natural to them. Right. So there is that little bit of just.

00:16:29.980 --> 00:16:33.710

WU, Xiaopei [Student]

I think calibration of just mindset that is working on.

00:16:33.330 --> 00:16:47.430

Interviewee 8

And then even companies, you know, like the stalls of the world, the the Santoni even and knitwear guys are starting to to to I have started to develop apex as well started to develop digital libraries of needs.

00:16:47.990 --> 00:16:59.900

WU, Xiaopei [Student]

Umm, yeah. Yeah, I'm seeing that. Like we have a very it's very comprehensive. This is like there's still this gap because it's like super comprehensive. But then I feel like there's still a gap because a lot of people that I've still talked to.

00:16:50.600 --> 00:16:50.860

Interviewee 8

Yeah.

00:17:01.000 --> 00:17:03.010

WU, Xiaopei [Student]

Even even the more.

00:17:03.640 --> 00:17:10.310

WU, Xiaopei [Student]

Because in Essex there's all these startups that are doing these more supposedly more forward thinking type processes, right?

00:17:13.110 --> 00:17:16.590

WU, Xiaopei [Student]

But like, if you look into it, when they the way they develop.

00:17:17.780 --> 00:17:47.370

WU, Xiaopei [Student]

Product is actually still quite based on old supply chain type of methods, right? And so I think that's interesting because there's all this really advanced technology looking at especially the apex, their whole like all in one system, it's very it seems at least they've tried to make it very seamless from everything digitized from the very beginning, right. But very few people that here are actually on the client side are like using it and you know one or two have mentioned like oh there's suppliers will send them a digital rendering of something and.

00:17:47.740 --> 00:18:15.260

WU, Xiaopei [Student]

There maybe the suppliers have the programs more so than they do, but yeah, it's just I think that's interesting is that like there's this like still it's like far away or they haven't quite. It feels like it's like probably takes huge commitment for them to reengage, change their process. And I think it's unfortunate because like it can offer so much it seems, but we're going back to I think we were talking about the digital assets and browse where specifically how.

00:18:16.260 --> 00:18:30.310

WU, Xiaopei [Student]

Like things like, uh, the textiles in the beginning that you select to put onto your like model, I'm assuming that you can scan different designs in. Is there at the moment in browser or do you know when like other 3D sampling?

00:18:22.920 --> 00:18:23.130

Interviewee 8

Right.

00:18:32.560 --> 00:18:43.370

WU, Xiaopei [Student]

Actually I know an apex they had this but like a way to like design textiles and be creative with textiles. Do you have that in browzwear and like can you talk about that a little bit like the?

00:18:43.110 --> 00:18:43.360

Interviewee 8

Right.

00:18:44.580 --> 00:19:14.570

Interviewee 8

Within you know broadswords always browzwear and and not just all the technology that we have but also you know we open up the browser edge to a lot of tech companies. When I look at the number of tech companies that already in this space apex just being one of them you know stole has the same thing. Santoni caller is also has this textile design and point care. You have a bunch of guys out there that have already been in the business.

00:19:14.700 --> 00:19:37.010

Interviewee 8

Of textile design. Now what they don't have alright is the if you wanna say they, if you the physical properties but to walk much as I could design and see how the textures would look like and I could apply it you know and see how an entire comments look like. You know how do I know the drape. How do I know physically how it works. That's the part.

00:19:37.880 --> 00:20:09.310

Interviewee 8

I mean we've we develop a machine that we put out there openly even to work with even competitors if they want to please go ahead and use it. But a way to say that if you were to, you know, OK, you design your textile and just the way it looks, you need it out and then you put it on the machine so that the machine can actually digitize it, bring a digital form of how that material would would behave, you know, in terms of a stretch in terms of its trip, in terms of thickness.

00:20:09.370 --> 00:20:38.850

Interviewee 8

That will be. That is pretty much what's happening in in the world today and and we when that deal, I mean we have, we have our own machine as automated, but some people do it manually you know and then write in the numbers and and they have all kinds of ways of trying to digitize material. But digitizing material is a big part of it's it's a very big movement today actually has for the last 2-3 years and it is going big. So you have the digital design, textile designers.

00:20:39.380 --> 00:20:46.420

Interviewee 8

But you also have the ones that are not just designing for the looks, but also moving of of, you know, bringing physical.

00:20:47.190 --> 00:20:51.250

Interviewee 8

Uh, elements of physical properties into a digital.

00:20:52.170 --> 00:20:53.650

Interviewee 8

Uh textile, yeah.

00:20:53.540 --> 00:21:23.570

WU, Xiaopei [Student]

You have to check design. Great. Do you think it's more actually relevant for people you know, mills that actually again I'm thinking more knitwear world but the mills that are actually creating these cards that have you know the swatches that a lot of the times it designers will just like use as is as their you know baseline because you're seeing it physically. So I'm like oh they like the way they they're stitches are and so also a lot of these mills especially in Italy they're already very creative. So they're creating there's milk hard books in a very creative way.

00:21:06.080 --> 00:21:06.230

Interviewee 8

Yep.

00:21:22.320 --> 00:21:22.570

Interviewee 8

Alright.

00:21:23.740 --> 00:21:37.280

WU, Xiaopei [Student]

So do you actually cause when I think about the way my sweater designers work, although a lot of them have a technical background, they're not like designing the Texel from scratch, right? So do you think something like the text style designing capability is actually?

00:21:38.610 --> 00:21:42.160

WU, Xiaopei [Student]

You should quite useful for people like the supply mill supply.

00:21:43.180 --> 00:21:47.240

WU, Xiaopei [Student]

Like mills and fabric suppliers versus actual clients.

00:21:47.790 --> 00:21:49.300

Interviewee 8

I'll sure. And I think that the.

00:21:48.480 --> 00:21:49.860

WU, Xiaopei [Student]

Have you seen them used it?

00:21:50.350 --> 00:22:12.640

Interviewee 8

Yep, that's, I said. I I've seen the like guys like stole. They've already started, you know, and then they're selling the machine to all those, you know, all this Italian guys and all that, right. So when the machine guys are starting to build their, you know, their digital base, you know, they're starting to build this and show it to the client. It's. It's an opportunity.

00:21:50.940 --> 00:21:51.490

WU, Xiaopei [Student]

OK, OK.

00:22:13.300 --> 00:22:16.110

Interviewee 8

It's an opportunity to market and sell yourself better.

00:22:16.800 --> 00:22:20.630

Interviewee 8

Uh, I remember years and more than 10 years ago.

00:22:21.460 --> 00:22:33.230

Interviewee 8

When uh, there was this uh, fabric meal, you know, uh came and and they they they they helped us to see that you know that they how much.

00:22:34.150 --> 00:22:40.160

Interviewee 8

They are cutting materials, they hire people full time, you know, to cut materials, put it in a Swatch chart and send.

00:22:41.740 --> 00:23:10.870

Interviewee 8

Cottons and cottons all around the world. I'm talking about big time. DHL causes cost. OK, it's amazing, right. And even then they said after I send this all out to people. All right, people still come back and they ask me, can you make make me a garment on this? I've already given you the looks and the feel country figuring ourselves. No. So I am this this particular meal. Anyway, he ended up having to to set up a A.

00:23:11.550 --> 00:23:23.940

Interviewee 8

Garment factory simply because people can't figure it out. So it started there as a marketing and all that. And then he started having to build more facilities. But he's not selling. He's he's not a he doesn't sell.

00:23:24.930 --> 00:23:49.180

Interviewee 8

Comments. You know it's apparel that he had to do it to help people to see what a little. So what he did was like, I need to do this all digitally. And this was ten years ago. It's like we we can't do this. Right. And he also doesn't want to to keep causing increase for hoping to sell because when you are sending cottons and cottons out, you know, what you're doing is you're hoping to sell.

00:23:49.890 --> 00:23:51.790

Interviewee 8

And he said, well, we are.

00:23:52.610 --> 00:24:13.080

Interviewee 8

You know, developing fabrics by thousands and thousands of yard. Alright, for this type of purpose, which means that it's not even impactful. It's not that that this is going to end up with someone use it. No, I we just hoping that someone would do it. And this is my entire operation. It was really amazing was my boggling to see.

00:24:14.860 --> 00:24:23.190

Interviewee 8

Digital this other things where I think digital can digital will fuel and is already fueling I think sustainability as well.

00:24:23.740 --> 00:24:30.050

WU, Xiaopei [Student]

Of course, yeah. I hope it will be more. So. Yeah, in that area. And will people will understand how important it is for that.

00:24:26.650 --> 00:24:26.870

Interviewee 8

Yeah.

00:24:31.720 --> 00:24:37.130

WU, Xiaopei [Student]

And then as the last question really is like if there was this hypothetical.

00:24:37.350 --> 00:24:51.220

WU, Xiaopei [Student]

A program, or even almost the ability, not just a program like say even in your in virtual sampling programs and those textile design side of it, if there's ability for it to.

00:24:51.870 --> 00:24:56.860

WU, Xiaopei [Student]

Collect data like have this machine learning aspect right and.

00:24:57.650 --> 00:25:27.210

WU, Xiaopei [Student]

So for the design to be able to give them certain attributes that they want for the textile designed to come out to be right, so like if it's either like a certain inspiration and input photos of inspiration and for again this machine learning algorithm to already have been collecting data, knowing like what has worked in the past or what the customer all that stuff and so and then to be able to output different say textile design options that reflect those needs right and reflect those attributes.

00:25:27.920 --> 00:25:48.740

WU, Xiaopei [Student]

Is that something that you would see being relevant and helpful or do you think it's like not because at the moment the way designers are working, they're either like we're already relying on pre creative physical sample you know physical mill cards or like they want to do that creative process themselves or they you know what the control of it. So yeah, what do you think?

00:25:49.460 --> 00:26:03.030

WU, Xiaopei [Student]

Of that hypothetical type process or that that capability, is that something that's useful for, you know, inspiring creativity like lead time, all those things, sustainability, all those things that we talked about or not, yeah.

00:26:03.730 --> 00:26:13.570

Interviewee 8

It's as I mentioned to you, it's something that will happen. No one you know it's it's something that's happening, you know? And and all creative process.

00:26:08.060 --> 00:26:08.910

WU, Xiaopei [Student]

OK. You think?

00:26:14.280 --> 00:26:42.010

Interviewee 8

Has a logic to it. People developed, you know, as you said, right people I get my Swatch or I get my knit card and then I start my design someone will start it the the guys who produced the knit cut the designers were producing the knit cut will start with also a logic of how they develop new structures and everything else everyone pretty much design is developed on a methodology.

00:26:43.530 --> 00:27:03.480

Interviewee 8

Right now, because you have this methodology itself, alright, that's why artificial intelligence, machine learning and all that come in. It works on algorithm, it works on a methodology now. So if you teach and you say this is exactly how, this is pretty much how I do it. All right. I guess an example.

00:27:04.620 --> 00:27:34.460

Interviewee 8

I gather people send me enough Swatch card. I I look at it, I feel it and and you know. So if if if the world was plugged in and connected to the different type of search cards that are being sent all around the world and we know which are the highest amount of switchboard, which are the ones that are, let's say in in the consumer world language terminology is click through. All right, you will be already funneling this to the designers and say this is not the these are the.

00:27:34.690 --> 00:28:06.100

Interviewee 8

Highest use knit cut. So then that there's a very high chance that the designer will start with again with recommendations and then moving through. So the entire methodology itself, what machine learning can come in or artificial intelligence come in to do is to gather all this and start proposing, start recommending and start and end because you start to do you start to teach it or you start to develop and your digitizing your methodology.

00:28:06.670 --> 00:28:11.790

Interviewee 8

All right. That's how the other side or the machine side actually does it more? No.

00:28:12.400 --> 00:28:13.660

WU, Xiaopei [Student]

Right, right. Told you yet.

00:28:13.210 --> 00:28:22.960

Interviewee 8

It's not this ability to collect, and it's not just one. It's saying if if a million designer uses the same type of methodology to do things.

00:28:23.720 --> 00:28:25.590

Interviewee 8

And we were to fit it all in.

00:28:26.460 --> 00:28:30.550

Interviewee 8

Alright. And and this is how they this is how most people to do it.

00:28:31.540 --> 00:28:34.620

Interviewee 8

You would naturally be able to to develop.

00:28:36.050 --> 00:28:36.360

Interviewee 8

Yeah.

00:28:36.650 --> 00:29:07.960

WU, Xiaopei [Student]

Really. Thank you. Yeah. So wait, I just want I just love talking to you. But like one last thing is that, like, I was curious, this whole idea of, like, collecting once you have all that information, like an easier way for me when I'm thinking about it, wouldn't it be easier for mills like to already input it versus because at the moment like when I think about how like she mistake, he is doing it, they have their whole thing where you're Yan bank, right. And they have that. I don't know what the machine is called. You guys might have it as well where they're scanning the yarn and it's learning from those attributes to.

00:28:41.880 --> 00:28:42.150

Interviewee 8

Sure.

00:29:08.030 --> 00:29:17.090

WU, Xiaopei [Student]

Be able to input it digitally and then they can basically knit like digitally knit that up and see what it looks like, but for me I'm like, why can't that process start?

00:29:17.730 --> 00:29:32.160

WU, Xiaopei [Student]

Earlier, like when the mills are making their collection, is there any of that kind of collaboration with mills at the moment so that it can start earlier versus designers actually starting and having to buy that and scan? I don't know all the yarns that they're buying.

00:29:29.660 --> 00:29:29.870

Interviewee 8

Right.

00:29:32.830 --> 00:29:42.850

Interviewee 8

Yep, and. And I think this is what, uh, this is where I also encourage and and a lot of time works with work, with meals and all that and say you guys start the digital process.

00:29:43.860 --> 00:29:47.680

Interviewee 8

Make it available to the people downstream.

00:29:48.730 --> 00:29:50.240

Interviewee 8

And that's that's how so.

00:29:50.940 --> 00:30:15.710

Interviewee 8

The is it available for this guys to do it this way? Yes, but again it's change management. It was one guy from 10 years ago who could figure out and say, hey, I'm doing all this wrong, but it's because it's the second generation, right? His father has been. He's been doing this for his grandfather and father's been doing this. I don't know for 100 years. And he took a third generation guy to come in and say, but this is not going anywhere.

00:29:57.400 --> 00:29:57.800

WU, Xiaopei [Student]

It's like.

00:30:17.070 --> 00:30:32.230

Interviewee 8

I gotta change the way this is not, and that was ten years ago. So 10 years ago, a mill already switched and think about doing things like that. We're talking about 10 years later. So The thing is not that is the technology available.

00:30:29.130 --> 00:30:29.380

WU, Xiaopei [Student]

Yeah.

00:30:33.230 --> 00:30:36.860

Interviewee 8

It's who is doing it and it's change management.

00:30:37.740 --> 00:30:37.920

Interviewee 8

Like.

<u>*Interviewee 9:*</u>

00:00:09.200 --> 00:00:16.850

WU, Xiaopei [Student]

It's quite an open one. I just wanted to ask what, if anything, do you know about how artificial intelligence is being used in the fashion industry?

00:00:18.510 --> 00:00:23.800

Interviewee 9

OK, so I what I what I know.

00:00:25.270 --> 00:00:56.140

Interviewee 9

Today actually is interesting because it it was much more important or or or I was more knowledgeable about it in previous jobs in larger companies that I have worked for. That's why I was saying to you that I actually went back to have a look at how it has moved on so much more since I it was even a part of my day to day. So when I when I worked at theory there was a huge push for us to use it in a production sense.

00:00:56.300 --> 00:01:27.490

Interviewee 9

I think the first time I ever really experienced it was to do with weather and this will have been about 15 years ago. It was as how we could predict how weather prediction would be beneficial to have, what items that we would produce. So that was the first time I'd ever heard of it. And it's obviously a very small and niche part of what it does now. Then the next, the next time I was introduced to it was at theory when we were really trying to.

00:01:27.560 --> 00:01:59.160

Interviewee 9

Look at the programs that were being developed in order to create less waste in our production. So in our sampling I would say like our, our for our salesman samples. So instead of producing every item in every color, the idea would be to have the A, our in-house model as an avatar that we were then able to show part of the collection or additional colors or additional fabrics on the model. So that's the first time I was introduced to it.

00:01:59.240 --> 00:02:32.340

Interviewee 9

In a real solid way that we were trying to implement it and we were trying to cook cost, Cook, sample wasted. But what? What was interesting for me at that time in my career, I was only focusing on knitwear and the programs were just not as efficient in being able to mimic anything to do with knitwear because of the, the the way that you start with a yarn that then can be done, you know, tension and stitches and all of those things change it so dramatically.

00:02:32.480 --> 00:02:42.090

Interviewee 9

Finishing and washing. So in sweaters, in knitwear, it really wasn't at that .10 years ago, able to really be an efficient part.

00:02:42.800 --> 00:03:12.970

Interviewee 9

Then you know my next experience at Tory, there was nothing that in our day-to-day working lives that was ever, ever brought up about any way of streamlining the process. Using any of this information from the designer point of view, whether or not that was happening outside of design, that is one thing. But from a design perspective, absolutely nothing. So I felt like there was a real time block between.

00:03:13.310 --> 00:03:45.960

Interviewee 9

Andrew Rosen being really, really keen on pushing technology for his business from cost and sustainability to it not being important and not discussed and not something that I was really participating in. And then I went to work for very small companies that are that again we don't we don't discuss it. We don't talk about it, it's not something we're implementing. It's not anything that comes into the way that I design into the way that I.

00:03:46.050 --> 00:04:16.200

Interviewee 9

Sample, not anything. So when you asked me to do this and I went back in and I started to explore, it was interesting to me that the amount I actually do know about it from a bigger picture point of view, how I know, you know that companies are using it to be able to assist people buying on shopping online from a fit perspective, having them understand how a certain garment will look on them, how glasses will fit a certain.

00:04:16.420 --> 00:04:28.410

Interviewee 9

You know, face shape and all of that. And then the more I started to look into it, there's a whole, you know, the prediction part of it and and.

00:04:29.680 --> 00:04:52.170

Interviewee 9

How gathering of information, I know that it's happening around me, but on a day to day basis of my work where I we're not you, we're not utilizing it, which actually now that I've been looking into it, it's quite scary that we're not utilizing it. So I mean as far as back to the to the question about what do I know, I now know.

00:04:53.150 --> 00:04:57.050

Interviewee 9

How people are gathering information, how people are.

00:04:58.530 --> 00:05:06.140

Interviewee 9

Creating entire apps of being able to almost visual Instagram a visual.

00:05:07.260 --> 00:05:20.530

Interviewee 9

Likes and don't likes of of information to try and and streamline. What's gonna go into the market. I was listening to a podcast last week about Motor Upper Upper Andy, about how their disrupting.

00:05:22.400 --> 00:05:24.610

Interviewee 9

Production for companies because?

00:05:26.010 --> 00:05:54.780

Interviewee 9

Instead of their product coming from the designer to the buyer, making the decision as to what they are going to show the customer because they are now opening up all of the look books to the customer, the customer now preordering things is determining what the company will actually end up producing as opposed to this one buy or these you know, the buyers from certain stores. So that blew my mind.

00:05:54.870 --> 00:06:04.420

Interviewee 9

And then in addition to that, I had zero idea that the there are now actually ways of purchasing.

00:06:06.290 --> 00:06:22.280

Interviewee 9

Clothes for your online persona, so your online avatar being able to purchase clothes that you never actually owed. So they're the kinds of things I know. But as far as what do I know and what am I working in? Absolutely nothing.

00:06:23.360 --> 00:06:55.850

WU, Xiaopei [Student]

No, I mean what you've said, well, first of all, I'm super grateful that like you are so intentional about it that you thought back at your previous roles too. And like everything you've said has been really illuminating, I think especially like you mentioned how at theory 10 slash 15 years ago, they already were thinking about being predictive with like whether or whatnot. And I think that's really fascinating.

So no, those are great examples. Suppose wanted to dig a little deeper in terms of like in so in your current role, you're saying it's not very present, right?

00:06:55.920 --> 00:07:01.270

WU, Xiaopei [Student]

In your current, the company you're currently working at and is that because just?

00:07:02.430 --> 00:07:15.830

WU, Xiaopei [Student]

You know or or how how is technology or digital any kind of digital technology incorporated, is it at all like anything from computer aided design or we can talk about like virtual sampling those sort of systems?

00:07:16.550 --> 00:07:30.160

Interviewee 9

So absolutely nothing in this current role, right? We're not doing anything and everything and and so, you know, one of the things that I was asking myself this last week about.

00:07:31.620 --> 00:07:47.420

Interviewee 9

Why? You know, I think from a it's a knowledge thing like I don't think the company I work for has experience that they're not. They're they're. They're obviously are a fashion company. But at the same time it's been built out of.

00:07:48.240 --> 00:08:18.810

Interviewee 9

A very hands on approach, a love of clothing, they've come into it in such a different way that it's never been introduced to them, and I didn't. I don't have the solid knowledge of it to be able to introduce it. I also think that from a company size where we're probably not big enough to be investing in, I mean, I don't know, maybe this maybe this information isn't expensive to invest in. That's something I don't know, but I would assume that it's a cost involved that we probably.

00:08:19.390 --> 00:08:25.110

Interviewee 9

Haven't thought that had enough value, but after this I would definitely wanna.

00:08:25.820 --> 00:08:48.330

Interviewee 9

You know, explore more of these options. One of the headlines that I read in one of the articles was that basically going forward, the companies that aren't exploring this are going to really risk not being able to survive. Basically, you know, in the future because everybody else will have so much more information. I think you know.

00:08:49.100 --> 00:09:00.160

Interviewee 9

One of the things I was thinking to myself is, is that maybe it's as a designer, maybe it's the fact that this is a, you know, this is out of a creative.

00:09:00.860 --> 00:09:31.120

Interviewee 9

Way of working so it takes away the mystique and magic almost of of designing, because apparently designers are supposed to dig deep inside themselves and be able to come up with these ideas that are gonna be well received by people. And that's why we've been paid the money we've been paid and that's why, you know, we feel like we're bringing so much to the table and then having something that hones into ideas.

00:09:32.270 --> 00:09:33.180

Interviewee 9

4 you.

00:09:33.970 --> 00:09:59.380

Interviewee 9

Almost makes you feel like you're a little irrelevant. You know, like you could just rely on something else. And so initially, when you asked me about this, I was thinking, well, this is just something that works for the old navies of the world, right? They don't, you know, like they're designers in some way aren't quite as creative of me or, you know, which isn't true. You know, this great people there, but you sort of think that maybe that works for these people who.

00:10:00.920 --> 00:10:24.430

Interviewee 9

Just wanna take a body and plug it in a color and you know don't change fabrics and it's kind of like almost kind of kidding the customer that they're receiving anything creative. But now I understand that this is actually just this is on all levels. This is all the way from the from Prada to Old Navy and you know, being able to.

00:10:25.440 --> 00:10:26.590

Interviewee 9

Figure out.

00:10:28.040 --> 00:10:44.180

Interviewee 9

Well, I guess also it depends what the end result is is the end result selling more is the end result. Customer satisfaction is the end result producing less you know, so it's it's wild actually and I and I feel like not knowing.

00:10:45.050 --> 00:10:48.820

Interviewee 9

Enough about it is gonna be a huge disadvantage to me.

00:10:49.970 --> 00:11:08.390

WU, Xiaopei [Student]

Well, I think a lot of people have that first impression that you have, which is that it will like, you know, you question, especially me asking designers this is that like ohh it's kind of like a parody paradox, right? Like, it's something that is potentially feared to, oh, would this replace the relevance or whatnot? But.

00:11:09.330 --> 00:11:38.620

WU, Xiaopei [Student]

I think like what I'm curious about is like, how would you see something like artificial intelligence or any kind of virtual digital technologies facilitating creativity, right? Because you're not just then you're asking the question like, what is the end goal? Is it for cost? Is it for, you know, sustainability, all these things that I think we've seen, virtual technology potentially benefit? What about you as a designer and your creativity? What parts of the process do you think it could help?

00:11:40.090 --> 00:11:48.020

WU, Xiaopei [Student]

Like digital technologies and AI could like help with your the creative side and not necessarily replace, but actually like facilitate that.

00:11:52.160 --> 00:12:22.040

Interviewee 9

I think we've had to through COVID and you know more time out of the office, step up into new ways of presentation, right? So I've already started to do that, you know, for the first, you know, the last 20 years of me designing, I have sat around printed pictures gathered. This gathered a Swatch of this gathered that made all these beautiful boards made.

00:12:22.130 --> 00:12:52.350

Interviewee 9

Ten boards, you know, waste of paper. Waste of time and energy, of cutting up all these bits and pieces, moving them around, starting again. And now I do it digitally. I just use, you know, PowerPoint and I, you know, save those images to my computer. And then I scan things in and I use my phone, you know, like, so I create everything digitally and I print one thing out, which for myself being conscious of the wastefulness of fashion that I experienced in other jobs.

00:12:53.090 --> 00:12:54.190

Interviewee 9

That in itself.

00:12:54.950 --> 00:13:26.080

Interviewee 9

Is even a big step forward for me. The fact that we are not wasting as much in that process. So that's one thing. I mean, it's not a I, but it is a digital format that I wasn't working in before. You know we the company that I work for now didn't didn't actually put boards together when I arrived everything you know they didn't, they didn't physically sit in front of a board and look at sketches over and over again. So they were being very wasteful in how much they were producing because they never really had a clear concrete vision.

00:13:07.240 --> 00:13:07.480

WU, Xiaopei [Student]

Right.

00:13:26.150 --> 00:13:57.970

Interviewee 9

View of what they were about to go and produce, so I have now it's very basic level. It's something that I've been doing for years, but we would now start to color up those styles, CAD them up so that we can challenge ourselves more into not overproducing or making too many samples in too many colors. So that's on a very basic level with the fact of all of the shipping issues that we're experiencing between America and China.

00:13:58.210 --> 00:14:21.290

Interviewee 9

Where starting to attempt to do virtual fittings which we don't have. The we don't have the systems that a lot of companies will have to do it. We're doing it very, very low key like actually just putting it on a person and looking at it and trying our best because the deadlines are not being met because if we're losing four weeks this season in shipping.

00:14:22.210 --> 00:14:35.920

Interviewee 9

So we're having to think about the manpower and how we can work closely with our teams in China to try and not ship samples anymore. And you know, just try and fit them virtually.

00:14:38.240 --> 00:14:55.650

Interviewee 9

I know that if I was more open minded, some of these programs where you can design and fabricate and see on an avatar would be very beneficial in wastage. I think that I just.

00:14:57.280 --> 00:15:09.640

Interviewee 9

Now that I'm old school, but I feel like I just haven't had enough concrete experience with it to feel comfortable, because also I'm still a designer that receives a sample and.

00:15:11.030 --> 00:15:43.230

Interviewee 9

Likes to turn it inside out. Likes to cut the sleeve off. Likes to get a different fabric and put it on it and see what happens. Likes to make it a top, you know? And and that happens in the moment, and it might not happen the same if it was the day after, or if somebody else wasn't in the room or the model wasn't wearing a certain pair of shoes that day. Like, so there's something so kind of fun and magical about designing in that way that I kind of get a little. I shut down a little bit when it becomes too.

00:15:44.240 --> 00:15:45.740

Interviewee 9

Robotic, I guess.

00:15:46.260 --> 00:16:10.880

WU, Xiaopei [Student]

Alright, alright. Well, yeah. So you mentioned a really great point about like the physicality which is with knitwear, like when you're developing swatches and whatnot. So it's really important obviously for the feel, touch, whatnot, that experience of it for you to make decisions. So how were you doing that over the pandemic or how were you not able to do that over the pandemic? Like how do you adapt to that? I'm not sure if, yeah, that changed a lot for you that process.

00:16:00.560 --> 00:16:00.870

Interviewee 9

Yeah.

00:16:11.110 --> 00:16:40.100

Interviewee 9

Well for me interestingly, like I was consulting, so both of my consulting job stopped the minute that we couldn't. One of the companies shut down what? So I wasn't really able to with Maria, we built a language already into the pieces like the I already knew my yarn. I had to stick with that yarn. I already knew my stitches, and I knew how that you know, how they.

00:16:41.320 --> 00:17:14.440

Interviewee 9

You would work and feel and behave, so we didn't change any of those things. I had to stick to what I knew, and I did. Virtual fits. I would. The samples would ship here. I would look at the details. I would ship them to Maria. Maria would try them on and we would. We would zoom fit. But luckily her styles are at that point were very, very tight. As far as newness. So I felt like I had a good gauge on what, you know, what I was expecting.

00:17:14.840 --> 00:17:28.220

Interviewee 9

And then we were back in the office by the December. So I was doing everything Ohh hands on and honestly I I work from home two days a week but I cannot do and I don't do anything.

00:17:30.290 --> 00:17:38.670

Interviewee 9

Other than Scatch, I'll sketch from home, but anything else I do in the office, so any design meetings I do one on one.

00:17:40.060 --> 00:18:00.590

Interviewee 9

It's just too interactive, like the process is the most fun for me when there's a team of people and we are discussing and playing. When you take that away from me, it just kind of feels a little. It's not as interesting to me, so I I guess I just save all those things to be done in person.

00:18:01.020 --> 00:18:35.890

WU, Xiaopei [Student]

Right. So OK, so these are like the final two questions. One is a, I was wondering if you heard or have seen these programs that I think both, I'm pretty sure both stole and SHIMA have like these programs which are now more so targeted for designers to be able to design like actual stitches and starting from a stitch right, the design that knit textile from there and then actually go on to design the sweater. So they originally obviously have things that you can program into the knitting machine which is more for the technicians and W?

00:18:35.960 --> 00:18:46.260

WU, Xiaopei [Student]

Not so. Now they have these programs that are more designed targeted. So those types of things. Do you feel like it's something that would be useful for designers or do you feel like it's still like?

00:18:47.120 --> 00:18:49.130

WU, Xiaopei [Student]

Most people like you yourself are.

00:18:50.020 --> 00:19:10.570

WU, Xiaopei [Student]

Used to and comfortable with seeing like going to a yarn show and seeing physical swatches and going from there being spired by like, you know, samples starting from like the physical and then kind of moving into the digital versus like actually creating something digitally from scratch. If you were granted, you would be trained on those systems and know how to use it and whatnot.

00:19:11.330 --> 00:19:22.200

Interviewee 9

So what? What are these programs do? You can say like ohh I wanna use stretch biscos and I wanna Jack card and I want this body and it'll show me what it's is. Is that what you mean?

00:19:21.630 --> 00:19:38.530

WU, Xiaopei [Student]

Yeah, well, they get a little even more technical than that. So you can they digitize yarns into their system, right? So you have a selection of different qualities that you can select and then you can go on to actually formulate the stitch and formulate the entire like.

00:19:39.190 --> 00:19:41.260

WU, Xiaopei [Student]

Sweater shapes and whatnot.

00:19:42.310 --> 00:19:52.080

Interviewee 9

And they and and the stitches have to be from that archive of digitized things. Or you can do whatever you want.

00:19:52.540 --> 00:20:01.960

WU, Xiaopei [Student]

You can do you know as long as it's physically able to be put into a search. Yeah. So any stitch that's possible, you can combine it. Yeah. And colors. All those options are.

00:19:57.970 --> 00:19:58.560

Interviewee 9

Right, right, right.

00:20:03.110 --> 00:20:05.570

WU, Xiaopei [Student]

I should have sent a video beforehand now.

00:20:04.700 --> 00:20:10.660

Interviewee 9

So for me, see. So this is a bit. There's a company called Tailored Industries in New York.

00:20:11.470 --> 00:20:43.030

Interviewee 9

And they basically it's somebody from SHIMA, I think, and somebody they designer from the designer system. From the row I believe. And they've set up this company where it's it's a membership thing. So there's it's tiered and first tier is you know nothing about knitwear. You walk in, you say I need a crew neck. I'd like it to be Kashmir. And what stitches can I put it in? OK. Well, this is sort of what is gonna look like next here is.

00:20:43.220 --> 00:21:00.800

Interviewee 9

Ohh now you can kind of maybe do your own colors and then the and stitch, but then the next tier is you can basically program whatever you want but again I explored that and it's sort of I guess in the same sort of what you're saying.

00:21:02.420 --> 00:21:31.870

Interviewee 9

I go to the yarn show and I will leave being so obsessed and excited about a yarn that I didn't know existed and it could be something kind of simple. It could be that it's a mercerized Marino like just all of a sudden mercerization on the Marino seems really exciting because I held it and it kind of wobbled in a weird way. Or it just felt crispy and I liked it that day. So I that's what I'm saying, I feel like.

00:21:31.970 --> 00:21:35.380

Interviewee 9

I, being a little bit older.

00:21:37.130 --> 00:22:06.520

Interviewee 9

Uh, ship my garden is a here being a little bit older. I I find it really difficult to understand and let let go and kind of be able to trust it or get excited about it. So I see the value and I understand the value and sometimes I wish that you know, I was 15 years younger and I had been educated into this way of working because I sound like my mother not being able to like use computers.

00:22:06.590 --> 00:22:06.810

Interviewee 9

But.

00:22:07.710 --> 00:22:40.140

Interviewee 9

It doesn't. Doesn't do it for me. It just does not interest me in the same way as being mind blown by the texture of something and then designing into. I choose yarn and then I design into it. That's the key difference. I think I'm a textile designer by trade, by, you know, training so other people are fashion designers who are obsessed with silhouette, who then wanna just plug in some yarn into it. Right where I start with the feeling of a yarn or a stitch.

00:22:40.250 --> 00:22:42.410

Interviewee 9

And then I find the right silhouette for it.

00:22:43.840 --> 00:22:48.880

Interviewee 9

Even though I'm a commercial designer, it's not like I'm some, you know, crazy.

00:22:51.150 --> 00:22:57.580

Interviewee 9

Designer and I'm a commercial designer, but I still go through that exact same process of being.

00:22:58.250 --> 00:23:04.530

Interviewee 9

Amazed by being able to mix yarns and see what happens. You know I still knit, you know.

00:23:04.960 --> 00:23:10.770

WU, Xiaopei [Student]

Yeah, yeah. Wait, so I do you have just one more more question, but do you have to attend to?

00:23:11.640 --> 00:23:13.460

WU, Xiaopei [Student]

Something, OK.

00:23:12.160 --> 00:23:15.390

Interviewee 9

No, no, no, no, no, no, sorry. I was just looking for Windows like those people then.

00:23:14.120 --> 00:23:16.230

WU, Xiaopei [Student]

OK, sorry. I was like, I feel bad if you had to.

00:23:16.290 --> 00:23:17.870

Interviewee 9

No, no, no, no, no, I'm fine. I'm fine. Fine.

00:23:20.140 --> 00:23:31.840

WU, Xiaopei [Student]

Holding that side, I just wanna. I'm gonna share my screen of something. OK, so this is just a hypothetical type process and I can walk you through it. So in case you can't see the writing, it's.

00:23:31.490 --> 00:23:32.310

Interviewee 9

Yeah, see.

00:23:32.880 --> 00:24:01.750

WU, Xiaopei [Student]

So just like a hypothetical, if there was a hypothetical program right where you could, it was like it would be based on AI where you could kind of input some of the attributes you would want for, say a Swatch, right? Say this is for knit down development. And so you have say inspiration images of the concept that for that season, whatnot, some of the basic attributes like if you want fine gauge whatever certain content, certain quality and then you would input this. And based on AI, the computer would.

00:24:02.490 --> 00:24:15.950

WU, Xiaopei [Student]

I'm having learned and being trained on these things before be able to give options that are relevant to what you input, right so and these options would look. They would basically be like knit down or stitch options right?

00:24:16.720 --> 00:24:46.620

WU, Xiaopei [Student]

Umm. And then these would also be integratable into like work as virtual skins for virtual sampling and whatnot. And I know that you were saying in your current role you're not so much using this or integrated into this kind of world, but could you see this being at all helpful for inspiration? So on almost like how you were saying like you would go to Yarn Cho and you feel like there's these subtle things that inspire you physically, right? Do you think this would at all appeal to designers as a form of inspiration? Like, if they're looking for something?

00:24:47.370 --> 00:24:56.560

WU, Xiaopei [Student]

New and different right. And then just to give like for a program to be able to give some options that are relevant to some of the search queries that you put in, right?

00:24:57.080 --> 00:25:29.390

Interviewee 9

I think it would be interesting exciting for a lot of people in the same way as when yacht. Now we have digital presentations from U, PW and all those people on their trend and all of that. And in the same way as WGSN was inspirational to a lot of people, I think it's it's the newest version of all of that. But it's still makes me feel like it's for a commercial market.

00:25:30.040 --> 00:25:34.830

Interviewee 9

With somebody who is on and I don't mean this in a negative way, but I I feels like.

00:25:36.800 --> 00:25:47.360

Interviewee 9

Not a sweater designer, right? I can't imagine somebody who was schooled in the way I was schooled finding this useful.

00:25:49.000 --> 00:25:53.830

Interviewee 9

Because it has too many flaws for me, right? Like.

00:25:54.260 --> 00:26:00.360

WU, Xiaopei [Student]

Wait, wait, elaborate. What do you mean by floors? Ohh, flaws, flaws. OK, OK.

00:25:58.270 --> 00:26:10.380

Interviewee 9

Flows. Yeah. So floors. Yeah. Because, you know, like yesterday I'm picking yarns and I'm sitting there and I'm holding the Swatch and I'm pulling it and I'm thinking.

00:26:10.990 --> 00:26:23.940

Interviewee 9

Is it good? Do I show you one and or two ends? Do you think I should add low power? Lycra would be kind of cool if I don't think it's gonna work for that. That style is and I just. I can't like.

00:26:24.920 --> 00:26:40.710

Interviewee 9

If I didn't sit there with the Swatch, I could make all these guesses right that this rib would be OK, or that, you know, do I want a three by three or a two by two? But honestly, I don't know how this visual would help me.

00:26:42.190 --> 00:26:52.800

Interviewee 9

Answer that question and I and I, but I I do honestly think that that is age and experience right. Like I think I'm coming to it.

00:26:53.510 --> 00:27:21.520

Interviewee 9

With so many layers of expectations and experience that I'm finding it hard to modernize my way of working. Whereas I wonder if I asked Mia the same question who studying knitwear, this is probably how she works all day long, or how she thinks about it. So it's just sort of like the age old. Like I'm like my mother now, but I it, but also not only do I not see how it would answer my question.

00:27:22.570 --> 00:27:24.620

Interviewee 9

I don't think I would find it very fun.

00:27:25.280 --> 00:27:26.110

WU, Xiaopei [Student]

Totally. OK.

00:27:27.650 --> 00:27:35.280

WU, Xiaopei [Student]

Well, and then you were mentioning about suppliers and mills. So like say like AU PW like a mill, you aren't supplier or?

00:27:35.960 --> 00:27:59.520

WU, Xiaopei [Student]

Umm do you think because they also have their internal designers or whatnot, right. So when they're actually I was wondering. I was thinking about asking Danny, but then I thought like first I would talk to you and see if you would know when, like, say Millie, Philly or whatnot, the mills are developing their swatches. They're Swatch collection for that season for the yarn shows. Do you know that if they have like, a creative team?

00:27:41.050 --> 00:27:41.630

Interviewee 9

Yeah.

00:28:00.190 --> 00:28:08.370

WU, Xiaopei [Student]

Doing that, and do you think this would maybe be more relevant for suppliers actually turning out like different Swatch options versus like you as a like?

00:28:01.400 --> 00:28:01.710

Interviewee 9

Yeah.

00:28:09.400 --> 00:28:10.050

WU, Xiaopei [Student]

Designer.

00:28:10.840 --> 00:28:11.890

WU, Xiaopei [Student]

On the client end.

00:28:14.680 --> 00:28:15.250

WU, Xiaopei [Student]

Yeah, I was in.

00:28:14.920 --> 00:28:18.950

Interviewee 9

I don't know, but I will ask him if you want and I'll email you.

00:28:20.810 --> 00:28:48.200

Interviewee 9

I think again part of the process for Millie Philly, I think, will also be testing, right, like they can design A yarn and make it. But part of its functionality and how it will be received by people will be did it look good in a rib, a cable and this and that. What happens if I mix it with this Yao, what happens? And the moment that they do those testings?

00:28:49.220 --> 00:29:19.070

Interviewee 9

Is when they discover it and I don't think a a computer can test it in the same way because the computer can't change the tension for the fine yard, like for instance like I'm looking, you know, like if I was to knit three different tensions of three different weights of yarn, I have to change the tension on the machine by hand. I can't knit that on an industrial machine. The first time. The first time I knit it, it had to be by hand.

00:29:19.190 --> 00:29:23.780

Interviewee 9

And it had to, you know, the machine. But like, I haven't machine, you know, but like it.

00:29:24.530 --> 00:29:27.530

Interviewee 9

I don't. I think part of their resources.

00:29:29.350 --> 00:29:30.480

Interviewee 9

Is the testing.

00:29:31.120 --> 00:29:35.410

Interviewee 9

So I I I would I think not, but I don't know the answer to that.

00:29:36.380 --> 00:29:43.110

Interviewee 9

Even like U PW, when they did the fully virtual presentation.

00:29:44.820 --> 00:30:03.190

Interviewee 9

Even though you're looking at it on a screen, I am looking at net textures, real NIT textures, not digital knit textures, you know so you can tell the difference. And even when I spoke to Mir about putting her presentation together for leaving college, I said you can have an online one, but it.

00:29:54.460 --> 00:29:54.940

WU, Xiaopei [Student]

Umm.

00:30:08.110 --> 00:30:16.660

Interviewee 9

They can touch things because that's what's gonna make them excited. And that again is me being old. But they're the people that she'll meet in the industry.

00:30:17.190 --> 00:30:17.870

WU, Xiaopei [Student]

Right, right.

00:30:20.770 --> 00:30:23.540

Interviewee 9

So yeah, I'm old. Jay will. I don't know the answers.

00:30:23.520 --> 00:30:50.800

WU, Xiaopei [Student]

No, no, honestly, this is really great perspective and it's it's like to see this whole spectrum of the industry. Actually I was surprised in doing these interviews. I think a lot more people than I thought were still kind of doing the what we call the traditional conventional process, right, like more akin to what you're still doing. And I think like it's just a reflection of partly like we're not moving on, but also there is I think for especially for knit where there's a lot of.

00:30:51.940 --> 00:31:02.790

WU, Xiaopei [Student]

The physicality just experience a creative experience of it. It's really hard to just replace with anything virtual. I think it's really difficult, right? So I think.

00:31:02.560 --> 00:31:24.240

Interviewee 9

I still. Yeah, I still sketch by hand. I find it. I mean, I I don't know how to sketch on the computer. That's that's the main thing. I don't know how to do it, but I've also never bothered to try. Right. So this is sketching on the computer has been something in my entire career that was available to me. I have been in the states for 22 years now.

00:31:24.350 --> 00:31:25.750

Interviewee 9

So I've been working.

00:31:26.660 --> 00:31:56.710

Interviewee 9

I I was working in textiles in London, but I've been working in fashion the whole time here so 22 years it has been available to me to sketch on the computer and for 22 years I've decided not to because I like to sketch by hand. I don't find it slower. I don't find I like, I just like it. So I've chosen not to do it. And even in the company as where I've worked, where it has been an expectation because I was at a level of my career where I had other people that could do it for me.

00:31:56.830 --> 00:32:05.360

Interviewee 9

I never did it, and so maybe that's just stubbornness, or maybe that's just because that's how I like, you know, it's it's part of the process to me, you know?

00:32:06.170 --> 00:32:19.540

WU, Xiaopei [Student]

Do you have processed headaches? Remember what, Tori? How the PLM system was a headache for your team a lot because it was just so much administrative stuff that took a lot of time. Do you have any of that in your current role?

00:32:06.270 --> 00:32:06.920

Interviewee 9

Where? Yeah.

00:32:20.680 --> 00:32:21.050

WU, Xiaopei [Student]

OK.

00:32:20.830 --> 00:32:52.200

Interviewee 9

No, we have no, we have nothing. We haven't. We just had a production person and you know we have we send the PO and we use Excel for our tech packs. But we don't have any of that. It's so low key and honestly that's probably why I'm in the happiest position I been right like honestly like there's nothing you know it's sketching it's meetings, it's interactions, it's it's touching fabrics, it's.

00:32:52.490 --> 00:33:03.760

Interviewee 9

Communicating with the team about likes and dislikes, it's colour chips, you know, it's just very playful and very nice and very old school and.

00:33:05.450 --> 00:33:31.710

Interviewee 9

Just less aggressive, like a lot of what I was reading up on and listening to a couple of podcasts in in, you know, coming to talk to you about this felt comical. Almost right. Buying clothes online for an avatar of your Instagram account that that you weren't even on holiday and you weren't on that jet and you weren't. You didn't have that Gucci bag like it is so far fetched and so ridiculous that.

00:33:32.620 --> 00:33:40.070

Interviewee 9

I can't even believe it's a real thing, but interestingly, a girlfriend of mine who works at bergdorfs, she's the head of.

00:33:41.980 --> 00:34:14.730

Interviewee 9

Lots of different departments, but when I was chatting to her about it at the weekend at this upcoming call, her mind was so excited about opportunity. She was like, that's amazing. The fact that you said you don't feel that you can utilize this information. She was like that means that these companies are missing out because they haven't spoken to people like you and know how to make it actually work for designers like it's all all for show. Almost like, you know, it's tech people designing tech things.

00:34:15.580 --> 00:34:32.430

Interviewee 9

Without the understanding of like the lowly old designer who, I mean, I'm obviously the art talking to designers, but there are there's so much more opportunity to make it actually functional for somebody like me because they're like you say, there are a lot of people like me.

00:34:33.160 --> 00:34:54.650

WU, Xiaopei [Student]

Yeah. No, I think there definitely is a gap with the people who are developing those systems. I'm curious to know what Mia thinks about, like, her generation thinks about the, you know, buying virtual NST type, you know, fashion. Right. Because or dressing your virtual avatar cause they they, I would assume their generation lives online a lot more than we do.

00:34:55.330 --> 00:34:59.230

WU, Xiaopei [Student]

And in a different way, in a more intense way than we do. And so I, yeah.

00:34:55.760 --> 00:34:56.110

Interviewee 9

Yeah.

00:35:00.070 --> 00:35:25.970

Interviewee 9

Ohh you should speak to her. You should set that up. Do you know the other thing that I think is interesting though? And and this might just be me, this might just be me. So I'm not talking for a generation, but I am surprised how we talk as a we talk as a society about sustainability and how the youth is going to save us and that this whole you know like it's gonna they're changing everything.

00:35:26.690 --> 00:35:32.520

Interviewee 9

But honestly, when I look at her and her friends, I don't see.

00:35:34.010 --> 00:35:53.470

Interviewee 9

I don't see it happening, so I think that what we assume they're all doing is not necessarily, you know, what is really happening because it takes so much effort to do these things and to live by them. And I I think the majority of them are all.

00:35:54.480 --> 00:36:02.460

Interviewee 9

As we all were at 22, a little self centered and and they're not really kind of pushing forward. But I don't know so.

00:36:03.720 --> 00:36:13.040

Interviewee 9

Yeah, you should talk to somebody of her age. She's at scared. I'm sure she should definitely talk to you if you want me to ask her. I don't know if you timeline allows.

00:36:14.030 --> 00:36:20.970

WU, Xiaopei [Student]

I mean, if she is not, if she's, I feel like she'd be busy in her senior year, so I'd be like bombarding. But I would love to.

00:36:20.350 --> 00:36:20.850

Interviewee 9

OK.

00:36:23.000 --> 00:36:26.660

Interviewee 9

Probably probably like what are you talking about, yeah.

00:36:23.570 --> 00:36:24.820

WU, Xiaopei [Student]

Especially you.

00:36:25.560 --> 00:36:31.820

WU, Xiaopei [Student]

So yeah, I yeah, I mean, if it comes up but or you can just ask on the side and you have a.

00:36:31.520 --> 00:36:34.010

Interviewee 9

Yeah, yeah, yeah, yeah, but yeah.

00:36:32.900 --> 00:36:40.440

WU, Xiaopei [Student]

But yeah, wait, I'm pause. This is I can end the formal part of this interview unless you have anything else to add on it.

Interviewee 10:

00:01:04.350 --> 00:01:06.100

WU, Xiaopei [Student]

So the first question is.

00:01:08.420 --> 00:01:10.280

WU, Xiaopei [Student]

What do you know about how?

00:01:10.970 --> 00:01:15.340

WU, Xiaopei [Student]

Artificial intelligence is used in the fashion industry, if anything at all, yeah.

00:01:19.070 --> 00:01:25.420

Interviewee 10

What I know about artificial intelligence in in fashion industries specifically.

00:01:26.390 --> 00:01:33.880

WU, Xiaopei [Student]

Or like, what do you think about? Is there anything you read or anything you think about when you hear like about artificial intelligence in history?

00:01:33.470 --> 00:01:35.160

Interviewee 10

Yeah. I mean, I think it's a.

00:01:37.050 --> 00:01:58.060

Interviewee 10

Definitely showing up in many aspects of fashion. I see it a lot in marketing. I see it a lot in job search like there seems to be jobs that were fashion designers designing outfits for different types of like avatars. Is that considered artificial intelligence? Yes.

00:01:56.490 --> 00:01:57.020

WU, Xiaopei [Student]

Yeah.

00:01:57.750 --> 00:02:04.160

WU, Xiaopei [Student]

Ohh sort of an sort of sector, I would say more digital fashion, but that's also.

00:02:03.590 --> 00:02:09.660

Interviewee 10

Digital fashion like metaverse like that, I see a lot. I also see big influence.

00:02:06.180 --> 00:02:06.440

WU, Xiaopei [Student]

OK.

00:02:10.300 --> 00:02:16.460

Interviewee 10

In the way people dress and the makeup and the way they want to look to embody.

00:02:17.500 --> 00:02:20.670

Interviewee 10

Uh, you know, futuristic.

00:02:22.610 --> 00:02:24.140

Interviewee 10

Log if you will.

00:02:25.360 --> 00:02:28.780

Interviewee 10

Which I associate with artificial intelligence but.

00:02:31.630 --> 00:02:33.440

Interviewee 10

There is probably a lot.

00:02:35.570 --> 00:02:37.860

Interviewee 10

Within like how to?

00:02:39.060 --> 00:02:45.460

Interviewee 10

Catch a customer. So in the marketing world, would I even see as a customer?

00:02:47.610 --> 00:02:53.580

Interviewee 10

Yeah, but that's really it. I otherwise don't really know much about it or everyday.

00:02:55.130 --> 00:02:56.580

Interviewee 10

We don't talk about it at work.

00:02:57.210 --> 00:03:28.060

WU, Xiaopei [Student]

OK. Then in your like creative design world, which is like obviously where you're focused on in that creative design process, how have you seen not necessarily artificial intelligence, but even like digital technologies facilitate your creative process like have you seen it and or have you like to what extent have you seen I'll just curious about that. So if you feel like it's very much integrated in it, it's not so much integrated in it like what's your experience with?

00:03:28.490 --> 00:03:30.120

WU, Xiaopei [Student]

Yeah. Digital technologies in general.

00:03:30.400 --> 00:03:45.170

Interviewee 10

Digital technology, I think is a little more integrated than specifically artificial intelligence. I don't know how that do you use them interchangeably those two because I consider them different things.

00:03:42.880 --> 00:03:43.360

WU, Xiaopei [Student]

They're.

00:03:45.340 --> 00:03:51.390

WU, Xiaopei [Student]

Yeah. Yeah, they're different. So like when I open on the interview, usually if people don't have much.

00:03:46.960 --> 00:03:47.410

Interviewee 10

Yeah.

00:03:52.220 --> 00:04:17.460

WU, Xiaopei [Student]

Interaction with real AI, which is like machine learning. Deep learning like data science, that side of things which a lot of people actually answer similar to you. They don't. Then I was curious more about digital technologies, which is what when I referred digital technology that's more like the CAD, even like Photoshop stuff, but now more. So I would say like the 3D sampling programs, the clothes, the.

00:04:15.850 --> 00:04:16.360

Interviewee 10

Umm.

00:04:18.120 --> 00:04:26.410

WU, Xiaopei [Student]

Browse wheres the 3D printing? Even? Yeah, those sort of things which I would imagine is a little bit more relatable for most of life. So yeah.

00:04:27.080 --> 00:04:33.090

WU, Xiaopei [Student]

In terms of from your experience, how would you say your interact have been?

00:04:31.510 --> 00:04:36.900

Interviewee 10

Yeah, I think the world of fashion really changed in the last few years.

00:04:37.060 --> 00:04:41.590

Interviewee 10

Uh, there. So like all the sketching.

00:04:42.690 --> 00:04:50.950

Interviewee 10

Not all the sketching. Actually, I shouldn't see all the sketching like more companies now that I worked with do Illustrator sketches.

00:04:51.890 --> 00:05:07.860

Interviewee 10

Only some really small company still sketch by hand, so like illustrator is I would say like a daily life for most designers. All the layouts hands get all the layouts and designs are done in Illustrator and Photoshop.

00:05:08.620 --> 00:05:35.820

Interviewee 10

UM, two companies I recently worked with which was low and Gray, which is by the part of LOFT they used cloud on regular basis. So we did get a lot of garments. Incluso as a first product, both from overseas factories and internally. And then this company bandy are also uses cloth for all the patter. A lot of the patterns even like just the technical designers, they will often use close to like check.

00:05:36.620 --> 00:05:41.120

Interviewee 10

The pattern and show us some options or some proportions.

00:05:44.310 --> 00:05:59.120

Interviewee 10

I also feel like there's a lot more obviously ways of communicating. Google needs zoom those type of like technologies are used on daily basis where it wasn't the case before.

00:06:00.910 --> 00:06:02.130

Interviewee 10

We.

00:06:04.500 --> 00:06:10.500

Interviewee 10

And I would say that's really it in terms of like innovative programs, specifically in design.

00:06:12.830 --> 00:06:17.360

Interviewee 10

Basically in design, but I feel like it's a little bit behind. It's not the most innovative industry.

00:06:18.440 --> 00:06:25.770

WU, Xiaopei [Student]

Yeah, for sure. That's what I've been hearing. So when you were talking about obviously the use of clove, for example, is that, are you?

00:06:26.500 --> 00:06:32.330

WU, Xiaopei [Student]

Using it or is it more your shown the the like like OK so it's.

00:06:29.870 --> 00:06:30.880

Interviewee 10

I'm not using it.

00:06:31.820 --> 00:06:46.430

Interviewee 10

I am being sound taking using it. Tech designers are using it and factories are using it. Designers are using it so a lot of factories will come back to us like we'll give them a tech pack and they will come back to us with a.

00:06:38.620 --> 00:06:41.050

WU, Xiaopei [Student]

Ohh, OK. And they're like.

00:06:47.290 --> 00:06:49.400

Interviewee 10

Avatar that's wearing the garment.

00:06:49.820 --> 00:06:57.520

WU, Xiaopei [Student]

So then how is that helpful? Or do you find it like, yeah, is it helpful in the process because it's like on the stage I would imagine?

00:06:55.170 --> 00:06:55.790

Interviewee 10

Yeah.

00:06:56.470 --> 00:07:10.340

Interviewee 10

It's like a fitting. Yeah. It's like a fitting. Sometimes we will try to cut down a product thing or, like, a production fitting and just look at it on the avatar and then that eliminates a sample.

00:07:11.190 --> 00:07:15.030

Interviewee 10

So it's God's it eliminates samples stage.

00:07:11.550 --> 00:07:12.070

WU, Xiaopei [Student]

It does.

00:07:13.100 --> 00:07:13.910

WU, Xiaopei [Student]

So it actually.

00:07:15.710 --> 00:07:30.460

WU, Xiaopei [Student]

OK, you're actually relying on it because sometimes when I've heard that people aren't, can't trust that yet, but you as the companies you've worked for, you feel like people can or have actually relied on those virtual avatar like models and whatnot.

00:07:28.730 --> 00:07:29.150

Interviewee 10

Yeah.

00:07:30.020 --> 00:07:41.020

Interviewee 10

I would say so, yeah. Umm and, but that's part of it is because probably the those companies like Lou and Grey and Bandier they make simple garments.

00:07:32.790 --> 00:07:33.030

WU, Xiaopei [Student]

OK.

00:07:41.470 --> 00:07:42.050

WU, Xiaopei [Student]

True. OK.

00:07:41.590 --> 00:07:47.750

Interviewee 10

Uh, a lot of it is like either fitted or yeah, like simple without much.

00:07:48.880 --> 00:07:56.090

Interviewee 10

The the pattern is not that complicated. The design is not as complicated, you know. So it's like pretty straightforward.

00:07:56.770 --> 00:08:17.240

Interviewee 10

And I think that's easier. I imagine if you work for a higher end company and bandeiras expensive, it's not cheap. But if you work for a higher end company where you can, it's more designer. I think it's gonna be it would be a little bit more complicated maybe to use cuz then you would want to check the fabric and so on. But I think good.

00:08:11.880 --> 00:08:12.080

WU, Xiaopei [Student]

OK.

00:08:16.200 --> 00:08:16.680

WU, Xiaopei [Student]

Yeah.

00:08:18.330 --> 00:08:19.910

WU, Xiaopei [Student]

So hold on.

00:08:19.500 --> 00:08:25.350

Interviewee 10

One, I'm just gonna cut. Uh. Continue, because one thing I should probably mention to you in terms of digital.

00:08:26.070 --> 00:08:32.050

Interviewee 10

Is the company Bandier that I talked to for a year about starting a new brand?

00:08:33.490 --> 00:08:53.960

Interviewee 10

That is a very exciting project to me, so we found this factory in Brooklyn. They are called tailored industries and they are super innovative in the fashion industry. I think it's a sweater manufacturing that's all fully fashioned garments. They have shimaseiki.

00:08:55.320 --> 00:08:58.640

Interviewee 10

That is machines I think there was like maybe 9 machines there.

00:09:00.060 --> 00:09:11.870

Interviewee 10

And what they did, which I find mind-blowing and a business I would love to get into, is they stock for different types of yarns and they produce on demand.

00:09:10.010 --> 00:09:10.350

WU, Xiaopei [Student]

Umm.

00:09:12.640 --> 00:09:17.640

Interviewee 10

To the point where I can tell them I want to create that sweater.

00:09:18.800 --> 00:09:34.230

Interviewee 10

And I want to offer it in 15 colors that you stuck. It's let's say the cashmere sweater in 8 gauge and I want to offer it in the 15 colors you stuck. They will make me a sample. It takes 3 days for the sample. I don't need the yarn stuck service.

00:09:35.010 --> 00:09:37.190

Interviewee 10

And then I can photograph the sample.

00:09:57.640 --> 00:09:57.990

WU, Xiaopei [Student]

OK.

00:09:59.960 --> 00:10:00.250

WU, Xiaopei [Student]

Yeah.

00:10:00.320 --> 00:10:04.570

Interviewee 10

Too complicated, so I have 15 SMS samples right? 15 samples.

00:10:05.370 --> 00:10:11.810

Interviewee 10

That took three days to make because they have the yarn. I got a product. They made me a product in a day. I fit it.

00:10:12.450 --> 00:10:19.760

Interviewee 10

And then the 15 samples were literally getting made in the next three days. So within a week I have a collection of sweaters.

00:10:19.210 --> 00:10:19.560

WU, Xiaopei [Student]

OK.

00:10:20.260 --> 00:10:20.450

WU, Xiaopei [Student]

Yeah.

00:10:21.140 --> 00:10:28.580

Interviewee 10

I put them on my shop. If I side, if I have a business like Bandier has a business, they can put it on their account on their Shopify site.

00:10:29.450 --> 00:10:30.900

Interviewee 10

And if the customer?

00:10:31.610 --> 00:10:37.780

Interviewee 10

Buys it. They go on to my site, they click, they buy the garment.

00:10:38.430 --> 00:10:54.390

Interviewee 10

We we send the notification gets pushed to tailored industries. They see a customer bought it. They need a sample so that the inventory is not existing, but they have the yarn they need a sample and they send it straight to the customer in our packaging.

00:10:55.880 --> 00:10:59.630

WU, Xiaopei [Student]

So there's less waste in liability, yeah.

00:10:56.040 --> 00:11:04.850

Interviewee 10

So there's no waste. There's no waste. Yeah, I mean, it's fantastic. I think it's fantastic business and there is no risk.

00:11:06.260 --> 00:11:09.560

WU, Xiaopei [Student]

That's true, but like usually.

00:11:11.090 --> 00:11:16.500

WU, Xiaopei [Student]

Do I mean did they use it at bendier like fully or were they exploring it?

00:11:15.770 --> 00:11:20.490

Interviewee 10

No, we are just, we are just starting to use it, but many companies are using it.

00:11:21.250 --> 00:11:21.860

WU, Xiaopei [Student]

Yeah, I'm just.

00:11:21.470 --> 00:11:22.410

Interviewee 10

I was just there.

00:11:23.100 --> 00:11:39.570

WU, Xiaopei [Student]

OK. No, it's awesome. I was just so curious about the process of cause you can design something that can get it out, but are you going to immediately feel like is it approvable to be able to put on a site and sell in that form, right?

00:11:38.820 --> 00:11:43.650

Interviewee 10

Well, you need to feel you. You will get samples as many samples as you like.

00:11:44.340 --> 00:11:54.630

Interviewee 10

Pre SMS but because they are very experienced it's a very high end type of a product so a lot of brands that work with them are like medium to high end.

00:11:57.380 --> 00:12:10.670

Interviewee 10

So like they have they have nice product. You know what I mean? Like it's all they work with Doctor and Duncan Kashmir and Phil Mark Cotton like they have nice yarns Italian yarns just for.

00:12:11.380 --> 00:12:12.810

Interviewee 10

And.

00:12:13.660 --> 00:12:23.570

Interviewee 10

Like when you give them A tag pack and you receive first product. For the most part that Proto is like really nice. So you still have to fit it.

00:12:24.370 --> 00:12:39.650

Interviewee 10

But it takes days like you literally request a proto. You get it like next day or in two days. You can even go there, fit it with them, and once you like, give them little tweaks to the product. Then you go to your SMS.

00:12:40.330 --> 00:12:42.150

Interviewee 10

And then that's essentially your production.

00:12:42.610 --> 00:12:46.280

WU, Xiaopei [Student]

And they managed the logistics of all like the same.

00:12:45.290 --> 00:13:14.860

Interviewee 10

They have a they have a program they in they invested into developing this program that is, uh, specific to them, where yes, they manage all the logistics. So the only thing you need as a company as a designer slash company is you need to link your Shopify account to their system. And then as you start working with them, you have an.

00:13:15.700 --> 00:13:16.410

Interviewee 10

You have.

00:13:17.370 --> 00:13:22.720

Interviewee 10

And access to their system, which like you go in, it's kind of, it looks kind of like a shopping retail website.

00:13:23.640 --> 00:13:31.180

Interviewee 10

You go in and you have about 500 styles to pick from, so you can pick a style they actually produced in the past and you can.

00:13:32.040 --> 00:13:37.210

Interviewee 10

Start reading attack back based on that style so you have an access to their tech pack.

00:13:37.980 --> 00:13:40.490

Interviewee 10

Let's say they made Apollo for, you know.

00:13:38.120 --> 00:13:38.520

WU, Xiaopei [Student]

Ohh.

00:13:41.480 --> 00:13:47.930

Interviewee 10

A A menswear line in the past that went into production like that, you can alter it.

00:13:49.310 --> 00:13:52.310

Interviewee 10

And you can work, you can just work from that.

00:13:53.040 --> 00:13:53.590

Interviewee 10

Sample.

00:13:54.240 --> 00:14:00.450

Interviewee 10

And the designs are not like they're not sharing other people's designs, they're sharing internal development only.

00:14:02.000 --> 00:14:11.280

Interviewee 10

Or things that I guess they are allowed to share. I'm not sure exactly. I didn't ask those questions yet, but they have a library about like 500 pieces. It's very interesting.

00:14:08.420 --> 00:14:08.620

WU, Xiaopei [Student]

No.

00:14:11.840 --> 00:14:34.280

WU, Xiaopei [Student]

Yeah, I'll look them up. I've heard. OK. So I've heard of them before. I left New York, and I've heard of them in the context of more manufacturer. But it's fascinating to hear that they've kind of like, developed this whole system that can facilitate almost, like custom, like direct to consumer type design. And yeah, that's fascinating. So it's cool to hear. OK.

00:14:27.130 --> 00:14:27.580

Interviewee 10

Yes.

00:14:36.170 --> 00:14:42.340

WU, Xiaopei [Student]

So going both sort of going back a little to knit, where specifically right in your knitwear?

00:14:43.070 --> 00:14:55.350

WU, Xiaopei [Student]

Design process obviously with sweater as you start with, like the swatches and you get inspired more from a material perspective. Until then, then you sketch into it and whatnot. So in that process, do you see?

00:14:49.820 --> 00:14:50.220

Interviewee 10

Umm.

00:14:56.320 --> 00:14:58.670

WU, Xiaopei [Student]

Are you or do you see UM.

00:15:00.250 --> 00:15:17.700

WU, Xiaopei [Student]

In the future, in the near future, like digital technologies, being involved in that more because at the moment it's more so like I'm assuming the close that you were talking about that and Taylor or Luo and Grays using is more is also for knitwear, right? Even though I know that.

00:15:13.630 --> 00:15:13.910

Interviewee 10

Umm.

00:15:18.480 --> 00:15:26.960

WU, Xiaopei [Student]

Sometimes with netword on fitting, it's like a little bit different when you fit it, but when we think about designers using it.

00:15:27.640 --> 00:15:47.720

WU, Xiaopei [Student]

At what, like a Swatch stage? Can you see that happening or do you see that as like or or are you like more used to? I suppose like when you've seen the people around you more used to just like looking at, you know, going to yarn shows and looking at physical swatches or vintage samples and getting your inspiration that way in terms of like stitches qualities and that, yeah.

00:15:32.560 --> 00:15:33.050

Interviewee 10

Yeah.

00:15:49.110 --> 00:15:50.120

Interviewee 10

You know I.

00:15:51.100 --> 00:15:55.850

Interviewee 10

Learned a little bit how to work more through digital images.

00:15:56.130 --> 00:16:07.420

Interviewee 10

Uh, over the last two years and I didn't quite make my peace with it. I will always be the person that prefers to touch things and feel it, and I actually don't necessarily.

00:16:08.560 --> 00:16:18.620

Interviewee 10

Love the way that fashion industry is moving into the digital world, but I think the newer generation of people, they don't mind, I think it's gonna create a different product.

00:16:19.480 --> 00:16:22.010

Interviewee 10

I think the product will be a lot less.

00:16:24.250 --> 00:16:25.260

Interviewee 10

Sophisticated.

00:16:25.960 --> 00:16:35.640

Interviewee 10

There will be less new onces in how things feel, how they look, the gauges, how materials look together because you are looking at things through a digital screen.

00:16:26.010 --> 00:16:26.420

WU, Xiaopei [Student]

Mm-hmm.

00:16:36.920 --> 00:16:42.670

Interviewee 10

And it's just that it's OK. It's a different world and I think you have to accept it. It's gonna create a different product.

00:16:43.370 --> 00:16:48.650

Interviewee 10

And I think I and I think a future customer wants that kind of product and that's what she's gonna be used to.

00:16:49.620 --> 00:17:02.750

Interviewee 10

And it's not only in fashion, it's across all kinds of industries. When you are painting something by hand, when you are feeling your pain, when you are feeling your swat, when you are touching your yarn, when you are knitting it by hand.

00:17:03.580 --> 00:17:06.830

Interviewee 10

I think the product not only has.

00:17:08.860 --> 00:17:15.290

Interviewee 10

Different look to it, but it also has a different soul to it, like there is just something you can't fake.

00:17:16.300 --> 00:17:33.230

Interviewee 10

When you are working digitally, there is so much digital art right now and garments are designed digitally only they're flat and they are on the screen and they're fine. They are nice garments, a lot of them look really good, but it's they're look different.

00:17:34.930 --> 00:17:50.910

Interviewee 10

Though I think I feel a little bit like a dinosaur and I sneak, I see. I really do see that age difference now and that generational gap where the younger guys have different needs, different likes.

00:17:51.590 --> 00:18:01.000

Interviewee 10

They want to go to a party at night. They want to go to 10 different parties and take photos of themselves there to show online that they went to the party.

00:18:01.760 --> 00:18:08.060

Interviewee 10

I want to go to a one party. I don't want to. I don't want to take any photos. I just want to, like, have a drink with my friend. You know what I mean?

00:18:08.800 --> 00:18:15.610

Interviewee 10

At a young guys have they just have different needs. So to answer your question personally.

00:18:11.500 --> 00:18:11.950

WU, Xiaopei [Student]

No.

00:18:16.410 --> 00:18:22.370

Interviewee 10

I to me know the result version will ever replace working with actual product.

00:18:24.020 --> 00:18:24.970

WU, Xiaopei [Student]

OK, no.

00:18:24.220 --> 00:18:26.530

Interviewee 10

I think you can cut down some steps.

00:18:27.480 --> 00:18:47.290

Interviewee 10

Like you know, I can get a catalog of yarns digitally and then I will pick what I think is right and then they will send it to my house or my office to actually look at. But I find it even then I find that like I will admit, things that are good and I will pick things that are terrible.

00:18:49.200 --> 00:18:52.650

Interviewee 10

So it's not to me, it's for me. It's personally not really working.

00:18:53.600 --> 00:19:05.410

WU, Xiaopei [Student]

Yeah. No, I think your answer aligned a lot with uh, most Netware designers in your like in our generation still, right. And I think like, yeah, it's.

00:19:06.520 --> 00:19:22.600

WU, Xiaopei [Student]

Very relatable. What you're saying. The whole physicality of things and also the sole thing like there's just something different with not not working with. Yeah. So it's a good, great, honest answer. So this next part is the last question. I'm just gonna share a screen with you. Right. And even though.

00:19:24.050 --> 00:19:27.610

WU, Xiaopei [Student]

Taking in consideration what you just said about.

00:19:28.190 --> 00:20:03.030

WU, Xiaopei [Student]

Umm you not, you know, necessarily being a huge fan of, like, just seeing these digital images, regardless of that, I'm still gonna just ask this question and you can still be honest. Right. So like, if there was, this is just based on a hypothetical type of program. Right. And I'll just walk you through it. So if there was a hypothetical program that was able to using machine learning like AI, right to you were able to put in certain attributes and qualities that you would want to design into, right for a Swatch. So say, like, there is some inspiration images.

00:19:38.260 --> 00:19:38.680

Interviewee 10

Yeah.

00:20:03.090 --> 00:20:33.890

WU, Xiaopei [Student]

But the concept that season and like you would specify what kind of like flying gauge just some basic attributes right of this watch that you want, you put it into the system and then it would be able to generate based on knowing all this type of information based on gathering it from the past, right, which is what machine learning does it trains on existing information and learns from that. And it was able to generate these images of swatches right that were ideally that were like be able to show.

00:20:30.680 --> 00:20:30.970

Interviewee 10

Umm.

00:20:33.950 --> 00:20:46.870

WU, Xiaopei [Student]

Texture and be able to really express A at least like quality a little bit, a little bit of the handful. Of course it's not physical, right? But with that at all be helpful, not necessarily to like final design but.

00:20:47.770 --> 00:20:52.070

WU, Xiaopei [Student]

At all, be helpful for like a kind of an inspiration stepping point.

00:20:52.700 --> 00:21:06.210

WU, Xiaopei [Student]

Umm, just to look at, do you think or do you find it something maybe not for a designer, but even for a supplier or even when mills make their yarn cards? Do you see? Yeah, this being helpful and.

00:20:52.880 --> 00:20:53.450

Interviewee 10

Yeah.

00:21:06.930 --> 00:21:09.510

WU, Xiaopei [Student]

Or what problems do you see in it still? Yeah.

00:21:12.060 --> 00:21:12.930

Interviewee 10

So.

00:21:12.930 --> 00:21:13.720

WU, Xiaopei [Student]

Kind of concept.

00:21:14.080 --> 00:21:30.880

Interviewee 10

I think that would be really helpful. Uh, I find it very helpful when, like yarn suppliers show their yarn in variety of stitches because the yarn looks very different in jersey versus Pointelle versus Milano and and you know others, such as it might look good and.

00:21:31.820 --> 00:21:32.450

Interviewee 10

So.

00:21:33.420 --> 00:21:51.420

Interviewee 10

For me, I think this would be helpful and it doesn't need to be like only the digital way of working. It could be mix right of like this step and a step where you actually get a Swatch. So if you pick like the stitches, let's say you can get a Swatch in your yarn that you want it.

00:21:52.220 --> 00:21:59.750

Interviewee 10

Umm, so would you would specify attributes you would get computer generated digital Swatch.

00:22:00.840 --> 00:22:17.650

WU, Xiaopei [Student]

Umm and like I suppose yeah. So I talked more about these stages, but those generated swatches could also be used as skins in a 3D sampling program if the company, I suppose was that innovative in the way they work and was able to expect like.

00:22:18.650 --> 00:22:26.130

WU, Xiaopei [Student]

Would be able to work in that way without seeing samples or like to your point, there could be a mixed method where you could have.

00:22:27.100 --> 00:22:31.730

WU, Xiaopei [Student]

Umm swatches made already based on these. Uh.

00:22:29.310 --> 00:22:29.790

Interviewee 10

Mm-hmm.

00:22:31.310 --> 00:22:45.390

Interviewee 10

I like that part. I would love. See, I don't like going into the sample as much right away because those samples to me when it's on the body like that, it's needs to be more detailed like.

00:22:46.970 --> 00:22:53.520

Interviewee 10

It's just applying a stitch all over, which is like not that exciting where maybe there is like a way of customizing it.

00:22:55.930 --> 00:23:01.900

Interviewee 10

I'm not really sure how I feel about like applying it on the body, but I really like the idea of like looking for yarn.

00:23:02.670 --> 00:23:26.280

Interviewee 10

Swap more like yarn and stitch and then maybe requesting those digital swatches and then from there being able to pick the stitches that I really like and applying them to like one or two or three different yarns and then getting actual. So it's almost like a knit down development getting actual swatches. I think that would be really helpful.

00:23:26.900 --> 00:23:30.150

WU, Xiaopei [Student]

Yeah. OK, totally. I hear you.

00:23:29.670 --> 00:23:32.340

Interviewee 10

I would do. I would use that actually a lot.

00:23:32.980 --> 00:23:45.120

Interviewee 10

Like let's say you know, I'm looking to for an in a new collection. I'm looking for something in linen and I can specify like I want open stitches in linen around 7:00 or five gauge, and then you guys suggest.

00:23:46.440 --> 00:23:48.420

Interviewee 10

The yarns and the stitches.

00:23:51.030 --> 00:23:59.640

WU, Xiaopei [Student]

Yeah. Yeah. So, well, it would generate more. Yes, in addition to actual visual of like the suggestion, it would be able to suggest.

00:23:51.100 --> 00:23:51.430

Interviewee 10

Yeah.

00:24:01.300 --> 00:24:21.240

WU, Xiaopei [Student]

Suitable yarns. I would create that effect and that cause you know like she is a she minor stole SHIMA they have their yarn digital yarn yarn bank right. And so they have been like in the process in the past few years scanning in like all the yarns from their supplies and digitizing them. Right. So like in this concept it would.

00:24:11.300 --> 00:24:11.770

Interviewee 10

Umm.

00:24:22.100 --> 00:24:22.820

WU, Xiaopei [Student]

Be.

00:24:23.520 --> 00:24:38.320

WU, Xiaopei [Student]

Able to be In Sync. Ideally you would be able to be In Sync with those type of databases of digitized yarns, so they would be able to link up and say like, oh, this kind of Swatch to create this effect. You know, it would be good with this say to sending yarn or whatever which is part of.

00:24:38.960 --> 00:24:46.790

WU, Xiaopei [Student]

The Yarn Bank, because they would be able to learn from the yarn bank. Uh, the digital yarn bank. So yeah, in a sense like I.

00:24:46.400 --> 00:24:49.390

Interviewee 10

I think this is very good if you come.

00:24:50.430 --> 00:25:00.430

Interviewee 10

A planet or the way for example, even with this new unit where factory, the way we go into work, because we are moving on with work and I think it's absolutely In Sync with what you are working on.

00:25:02.030 --> 00:25:04.120

Interviewee 10

What happens is we are first.

00:25:04.820 --> 00:25:07.150

Interviewee 10

Looking at actual yarn cards.

00:25:09.250 --> 00:25:11.200

Interviewee 10

Then they're getting digitized.

00:25:11.990 --> 00:25:38.360

Interviewee 10

And then you can put them in any stitch. So like that's just how they work, right? But you can, if you don't know what like yarns you want, you can also pick, I guess, like I'm looking for cashmere in this cage or I'm looking for something that's exporting and techie like that would be great. Like me working coming from network design. But now I work on variety of product. Right. I I'm in swim. I'm an active. I'm an all kinds of products.

00:25:39.380 --> 00:25:40.550

Interviewee 10

So I.

00:25:41.500 --> 00:25:46.150

Interviewee 10

Visiting that factory, they just create a line of of swim.

00:25:47.350 --> 00:25:48.450

Interviewee 10

In sweaters.

00:25:49.460 --> 00:25:57.960

Interviewee 10

And they actually went through a whole process of looking for yarns to create to functional yarns to be able to make actual swim. You can swim in.

00:25:59.740 --> 00:26:26.450

Interviewee 10

And I can send you a link to the brand that makes it so you can actually swim in those garments and they are fully fashioned without any wastage coming from the shimaseiki machine. So that would be great if I can say like swim or for me like I would love to create active garments, leggings and bras that you can work out with in, in sweaters. Like can I put in active?

00:26:27.530 --> 00:26:34.860

Interviewee 10

Uh, you know yarn that has active component to it, like maybe a week gang, maybe like drying. Maybe machine washable.

00:26:35.860 --> 00:26:38.930

Interviewee 10

And then this gives me yarn options.

00:26:39.830 --> 00:26:42.660

Interviewee 10

And then stitches, I can use it within that yarn.

00:26:43.110 --> 00:26:46.840

WU, Xiaopei [Student]

Umm, yeah, yeah, that's great. I mean, well, on a sign.

00:26:45.470 --> 00:26:47.200

Interviewee 10

I don't know. I don't know if that's helpful.

00:26:48.210 --> 00:26:56.920

WU, Xiaopei [Student]

No, no, your answers are super helpful. So don't. Yeah. No need to. I'm gonna stop sharing this because I think I've got.

00:26:58.020 --> 00:26:58.350

WU, Xiaopei [Student]

Enough.

00:26:59.710 --> 00:27:16.890

WU, Xiaopei [Student]

Good feedback, but yeah, I appreciate the honesty. I mean, I technically aligned with a lot of what you're saying, but it's just good to kind of confirm cause with research. You can't assume that what I think is the same as what everyone else is. So yeah, it's nice to kind of ask for this feedback, but.

00:27:17.580 --> 00:27:27.800

WU, Xiaopei [Student]

Umm, what was I saying? Ohh the the similar. Sorry I in general I've been really curious cause a girl in my program she she her research was doing.

00:27:19.230 --> 00:27:19.770

Interviewee 10

How many?

00:27:28.570 --> 00:27:48.380

WU, Xiaopei [Student]

How do I say it's swimwear? That would help keep like for kids that would have flotation in knitwear. Sorry, knitted swimwear so I don't know. I actually didn't see her final project, but that was her whole research. And so basically the idea of somehow like creating errated like yarn or like a structure so that it would, you know and also.

00:27:47.730 --> 00:27:49.020

Interviewee 10

Wow, cool.

00:27:49.370 --> 00:27:53.880

WU, Xiaopei [Student]

Yeah. And the cool thing that her research is at her point is that you know how, like, when we put on.

00:27:56.240 --> 00:28:08.310

WU, Xiaopei [Student]

Like what do you call it? The floaties, like, they're always really hard to get on. They feel horrible. And the skin, when you like, kind of squeeze like them on and like for kids too. And it kind of hurts. It kind of like stretches your skin.

00:28:08.080 --> 00:28:12.710

Interviewee 10

All I found an amazing floating company that you rolled them on.

00:28:13.230 --> 00:28:14.280

WU, Xiaopei [Student]

Ohh cute.

00:28:13.400 --> 00:28:20.940

Interviewee 10

They roll up, so they actually it's around floaty. Sorry to cut you off, but you put them on your arm and then they roll up.

00:28:22.640 --> 00:28:30.400

Interviewee 10

And the material feels like fabric. It doesn't even feel like like that. I'll send you the link. See. Like, there's so much amazing product.

00:28:30.240 --> 00:28:30.750

WU, Xiaopei [Student]

Yeah.

00:28:31.070 --> 00:28:32.740

Interviewee 10

Yeah, but yeah, so that was.

00:28:32.850 --> 00:28:52.510

WU, Xiaopei [Student]

I I love discussing stuff like that, but yeah, it's like cool to talk with people who are thinking ahead. Yeah. Like her research. Just thinking ahead and like, it was really quiet. She was thinking for kids, sort of how to use knitwear and also knitwear with the stretchiness and, like, just the more comfort side of things it could be. I thought it was a good thesis opening.

00:28:48.310 --> 00:28:49.050

Interviewee 10

Mm-hmm.

00:28:52.910 --> 00:29:16.420

WU, Xiaopei [Student]

Umm project but anyways yeah, so when you mention like swim, we're also in, it's like, oh, I really want to buy one because I bought this tank recently, just from Zara. And it was just a Jaccard, like, really cute. I was like, ohh, wanna wear it to the beach, but it probably wouldn't be good in the water. So just thinking about recent like, oh, is there a good knit knitware swim brand. But yeah, so curious about that. The company that you mentioned as well.

00:29:16.360 --> 00:29:26.110

Interviewee 10

Yeah, I mean, there was a lot of people that do some kind of a knit thing to wear at the beach, but not really swim in. And this brand does actual swimwear.

00:29:23.550 --> 00:29:23.750

WU, Xiaopei [Student]

Bye.

00:29:26.800 --> 00:29:27.090

WU, Xiaopei [Student]

Yeah.

00:29:27.030 --> 00:29:47.510

Interviewee 10

So cool. So like, yeah, would I think it would be amazing to start a brand that is innovative and and feels good and it's it feels good. It feels good. Not only like by the way, it's your wearing it on your body, but it feels you feel good about like spending your money on it and knowing that it was.

00:29:48.200 --> 00:30:04.160

Interviewee 10

Produced in good conditions and people get paid well and the color is beautiful and makes you feel good. You know what I mean? Like. And you are not overproducing. You're not just creating something nobody wants or needs. So either doing something in fashion that feels good.

00:30:05.200 --> 00:30:22.010

Interviewee 10

In all aspects of the brand or doing something that's using network but creating product that's perhaps outside of fashion like your friend did that creates a product that might be helpful to to humans or not humans just in general.

00:30:22.740 --> 00:30:26.040

Interviewee 10

Ah, that we can, you know, apply to our daily life.

00:30:26.740 --> 00:30:27.470

WU, Xiaopei [Student]

Yeah, yeah.

00:30:27.430 --> 00:30:34.120

Interviewee 10

So for me, like that would be the goal over the next two few years to come up with like the the next step in my life.

00:30:34.780 --> 00:30:53.460

Interviewee 10

And instead of just creating more garments, say working in the same old fashioned way, we have been working, just really taking a step back and trying to figure out how I can apply the skills and the relationships that I have to create either a cool product or a brand that feels good.

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